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Graphite

VOL. VII.

APRIL 1904.

No. 5.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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THE BOSTON BOY AND THE CINCINNATI JUDGE.

A nice little boy, reared in the intellectual and heterodox atmosphere of Boston, happened to be a witness in a case in Cincinnati, and the question arose as to his being old enough to understand the nature of an oath, so the judge investigated him.

"Well, Wendall," he said kindly, "do you know where bad little boys will go when they die?"

"No, sir," replied the boy with confidence.

"Goodness gracious!" exclaimed the judge, in shocked surprise, "don't you know they will go to hell?"

"No, sir. Do you?"

"Of course I do."

"How do you know it?"

"The Bible says so."

"Is it true?"

"Certainly it is."

"Can you prove it?"

"No, not positively; but we take it on faith," explained the judge.

"Do you accept that kind of testimony in this court?" inquired the boy, coolly.

But the judge didn't answer; he held up his hands and begged the lawyers to take the witness.

—*Washington Critic.*

AS GOOD AS GOLD.

One of our people, reporting on a job temporarily not successfully done, added he hoped he would be excused as he did the best he could. We replied, "No." His task was to do it, to succeed—to get what he went for. If a given thing can be done, the man in question must do it, or sooner or later let some one try who can do it!

—JOHN A. WALKER.

DIXON'S GRAPHITE AXLE GREASE.

The Columbus Buggy Company, Columbus, Ohio, manufacturers of buggies and carriages, advised our traveling representative that Dixon's Graphite Axle Grease is the finest grease they have ever had and all that we have ever claimed for it. They order it in barrel quantities.



At the present time, the largest use made of graphite, otherwise known as plumbago or blacklead, is in the manufacture of melting vessels, known to the trade as crucibles.

Graphite crucibles were first successfully made by Joseph Dixon in 1827. They are made in sizes ranging from that of an after dinner coffee cup to one in which a six foot man could easily hide. They are used for melting metals of all kinds.

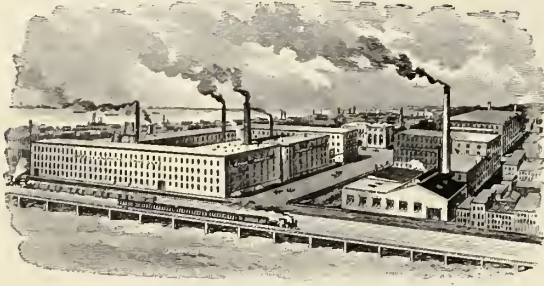
THE JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.—the same Dixon people whose celebrated pencils have written so much of the world's history—have sent us a handsome booklet of 32 pages, printed on enameled paper and the cover executed in colors. This booklet is beautifully illustrated with half-tone engravings and is devoted exclusively to showing the various uses to which graphite is put. We were surprised to find graphite used for so many purposes. The booklet is called "Graphite Suggestions," and we think it would pay all our readers to write for a copy.—*The Western Painter.*

THE MAN who is worthy of being a leader of men will never complain of the stupidity of his helpers, of the ingratitude of mankind, nor of the inappreciation of the public. These things are all a part of the great game of life, and to meet them and not go down before them in discouragement and defeat is the final proof of power.

—FRA ELBERTUS.

ESTABLISHED 1827.

INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J., U. S. A.

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CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., April 1904.

AN ENJOYABLE TIME.

While there are very many pleasurable memories in the minds of the Dixon staff, and many dates that, like fixed stars, are ever before them, they never hesitate to take on new dates and add to the stuff of which dreams and memories are made.

March 3, 1904, is the latest date put on the tablets of the Dixon staff. The occasion was the annual dinner by Vice-President Walker.

There were present twenty-five Dixon men, the range in time of service in the company being from two months to thirty-seven years. The youngest in service was Mr. G. P. Hutchins, and the veteran was Vice-President Walker.

All Dixon dinners are enjoyable affairs and this one was none the less so. Toasts were drunk to the much loved President and Vice-President and to the absent ones who so efficiently represent the Dixon Company both here and in foreign countries.

"THE AMERICAN BUSINESS BOY."

Elsewhere in this issue is a highly interesting and instructive article on the above subject. It was written by the Vice-President of the Dixon Company at the special request of Mr. Marshall Cushing, Secretary of the National Association of Manufacturers of the United States of America.

Those who read it will find it in Mr. Walker's happiest vein and possessing a newness and treatment quite unusual in such subjects.

Although the life and work of Mr. Walker is very generally known, probably the following, from a late issue of the *New England Journal of Education*, will be considered timely by Mr. Walker's many friends:

"The active, energetic, thoroughly capable manager of the concern, the vice-president and treasurer, is John A. Walker, who came to the company as its first secretary in 1868, who has been general manager since 1881, and vice-president and treasurer as well as manager since 1892, and to whom more than to all other men combined, the business success of the concern is due. For the extension and growth of the pencil department he is entirely responsible. The records show that Mr. Walker was born in 1837, but no man bears his sixty-six years more lightly. His life has been one of the most tremendous activity, and he turns off an amount of work that would stagger most men because he possesses one attribute which Joseph Dixon (whose close friend he was) lacked: the power of using the services of other men and of not wasting his own time on small things. There are brave fighters who cannot command companies, and men who can command regiments or brigades under explicit orders, who yet cannot direct the movements of armies. Mr. Walker is the general, who, with his glass, takes in the whole situation and intelligently directs the many divisions, at the same time the minor details do not escape his attention. Outside the Joseph Dixon Crucible Company he is one of the governors of the Union League Club of Jersey City, is interested in clubs and societies and movements in Jersey City looking to the betterment of the condition of the citizens generally, was the president for several years of the Board of Education. With his business accomplishments he has a ready and facile pen, and could take to-day a high place in the literary world should he choose to bend his energies in that direction."

USUAL RESULT.

"Ruined, and by a woman!" exclaimed the man at the desk, as he gazed at something in his hand.

"I fail to see the point," rejoined the other occupant of the office.

"Same here," said the party of the first part. "I was speaking of this lead pencil, which my stenographer has evidently been trying to sharpen."—*Chicago Daily News*.

EASY WORK.

I'd like to have a nice soft job,

Where I could simply be

A sort of weekly visitor

To draw my salary;

And then, as that got burdensome

And seemed inclined to bore me,

I'd like to have some fellow paid

To go and draw it for me!

—*Baltimore News*.

Metal Industry says: Steel of a quality equal to that made in crucibles has never been reached by the open-hearth or Bessemer process, and brass always gives better results when melted in crucibles.

METAL GATHERING ON SPACEBANDS OF LINOTYPE.

H. G. writes from New York: "What causes metal to stick to the short slide of the spacebands? The bands are cleaned every day. This happens only on one machine." *Answer.*—One certain spot on the spaceband sleeve is presented to the mold at each successive cast of a slug in the Linotype, and the heat eventually oxidizes this part of the sleeve and puts the steel in such a condition that metal readily adheres to it. It can only be temporarily prevented by thoroughly removing the film or stain at this point and polishing the spot with powdered graphite.—No. 635 is the best.—*Inland Printer.*

RED LEAD CAUSES SICKNESS.

Plumbers put red lead around the joints of a new iron pump at the minister's house at Penn Grove, N. J., and all the family were made sick from lead poisoning. The safest and best article for such a purpose (around water pipe joints) is an article made by the Joseph Dixon Crucible Co., being made from graphite. This is non-poisoning, allows joints to be easily unscrewed, and does not suffer from contact with fire.—*Master Painter.*

THE LIFE OF AUTOMOBILE CHAINS depends very much on the care they receive in the way of cleaning and lubrication. The application of lubricant to the outside of the chain is of doubtful value. Lubricant thus applied has a tendency to catch and hold dust and dirt, and does not readily get to the wearing surfaces of the pins and links, where it is wanted. The chains should be thoroughly cleaned several times a year with hot water and a brush and then with kerosene. After they have dried they are preferably given a treatment with some chain lubricant. The best chain lubricants are those which are solid when cold and are heated and the chain soaked in them while the lubricant is in the liquid state, the reason being that a dry lubricant will not collect dust to any extent. For this same reason graphite makes a very good constituent of a chain lubricant, and a leading graphite manufacturer now produces a graphite chain lubricant which is applied by the "heating and immersion" process. The chain must be left in the bath of lubricant long enough to allow the latter to penetrate into all the joints; it is then taken out and dried and cleaned of any lubricant adhering to the outside of the links.—*Horseless Age.*

MR. JOHN A. WALKER

Becomes a Member of the Colonial Society, and is His Usual Jovial Serious and Entertaining Self.

The Colonial Life Insurance Company of America gave its sixth annual dinner January 16, and we quote from the "*Banquet Supplement*" the following:

One of the pleasantest and most popularly received incidents of the dinner next followed, viz: the introduction of the Vice-President, the Hon. John A. Walker, and the decoration of him with the emblem of membership in the Colonial Society. It was a truly delightful event.

Mr. Walker's popularity increases each year. That is readily explained. Those who have heard him speak once are anxious to hear him again, and those who have never

heard him, have been told so much of his qualities and powers as a speaker that they wait eagerly for the privilege. He received an ovation as he turned to the "boys," displaying on his lapel his badge of service pinned by the hand of the Second Vice-President.

When we say that Mr. Walker excelled even his reputation as a speaker, you can appreciate the difficulty of giving anything like a fair report of his address. Perhaps more conspicuously than any feature stood out his droll and easy humor, which about convulsed the audience. Keen in his wit and alert to use every opening, he makes a most enjoyable "banqueteer." The reason he alleged for his selection as chief orator was as funny as it was untrue. After a few minutes sport-making, the Vice-President expressed the appreciation of the Board of Directors of the work which had been done by the staff since the formation of the company, and their confidence in the splendid future of the Colonial. They were proud of the men who had brought the company to its high place, and had the utmost faith in their ability to continue the magnificent record. He was glad to meet the victors—the men who had done great things—the men who had overcome the difficulties and conquered discouragement and now were wearing palms of victory. He paid a splendid tribute to those who had fought with the company in its early battles and had lived to see the day of its triumph.

Six years ago he had talked of the necessity of building upon a sure and solid foundation. He was at that time seeing by foresight. Now he saw hindsight and knew that the Colonial foundation had been well laid, and that already an imposing structure had been erected, which was to grow in height and size as the years progressed.

The words of Mr. Walker produced a deep impression. It was worth the years and months of toil and thought on the part of the Field to hear from the Vice-President and the representative of the Board of Directors, that their work had been appreciated and that the future was looked into with the utmost confidence. There is a sincerity about Mr. Walker that hits home. His speeches have the true ring and for that reason their sound and their note stay long in one's memory. What he says is well worth hearing and not soon forgotten.

ARTIFICIAL LIGHTS DEPEND ON CARBON.

It may be of interest to our readers to know that all forms of artificial light now in practical use depend for their lighting properties upon the incandescence of a solid—usually carbon, either in the form of a filament or a rod, as in the ordinary glow lamp or the arc, or in a finely divided state, as in gas and kerosene lamps. Graphite is one of the most useful forms of carbon.

GRITTY.

"Fifty miles an hour," yelled the chauffeur. "Are you brave?"

"Yes. I am just full of grit," replied the pretty girl, as she swallowed another pint of dust.

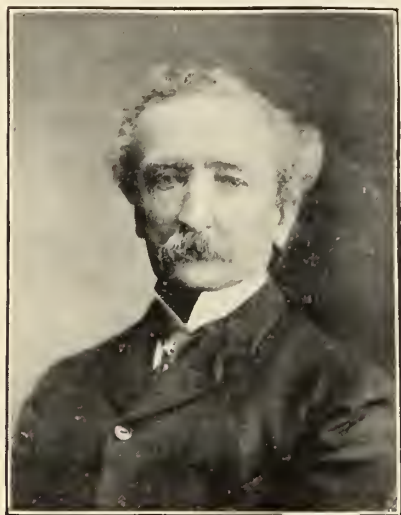
The driving chain is also probably full of dust and grit and needs Dixon's Motor Chain Compound to keep it in proper condition.

(Reprinted from "American Industries.")

HOW IS THE AMERICAN BUSINESS BOY TO GET ALONG?

By JOHN A. WALKER,

Vice-President, the Joseph Dixon Crucible Co.



I assume from the topic assigned me that I am primarily to address the younger people, those looking at the ladder or who are not higher than the first rung, and only to interest the seniors by comparison, or in a reminiscent way.

The first thought is, you won't all "get along." Once at the Gare de St. Lazare Hotel, in Paris, I ordered a canteloupe for breakfast, and a divine fruit came. Its luxury still lingers in my taste. Every morning thereafter I repeated the order, but never got a second melon like the first. Every orchard is strewn with rotten apples; the process of selection goes on everywhere. Many are called, few are chosen. Foolish people criticise the Calvinistic faith for its doctrine of election, when election is the doctrine of the universe; and in every walk and profession there are elect and non-elect, so that it is safe to say: all boys won't "get along." Hence, if some won't and some will, it is for the individual business boy quite a serious question: Am I one of the business elect? "Yes or no" remains with the boy himself.

If, then, some will and others won't, why the success or why the failure? Differences in talent, you say, explain some victories. In a broad way, yes; but many, many talented men are stranded. Difference in opportunities explains many a failure, yet some with no help make their own opportunities, and others with paths strewn with chances lose the road. It cannot be the particular industry, says Andrew Carnegie, as some will rise in dry goods, some in stocks, some as bankers, some in wool, some in iron and steel, some on land and some on sea—concludes it is "all in the boy himself"—and not specially in the industry. Some succeed, one doesn't know why the reason seems hidden.

It is not book learning exclusively, for some unlearned succeed.

It is not virtue especially, for somewhere it is written: "the wicked flourish like a green-bay tree."

It is not opportunities, for some of the most pronounced successes come without helping circumstances.

It is not capital, for all the industrial captains of to-day, to a man almost, began with nothing.

It is not good clothes or poor clothes, for examples of both succeed and fail.

It is not even good manners, for the paths both to the heaven of success or the hell of failure are strewn with examples of either type.

It is clear, then, that success is not exterior to the boy—for every exterior line that you point out, shows both failures and successes. So the boy who is to get along must look inward, look to himself. When we come down to bottom facts doesn't the success, the "get along," reside more in the boy's personality than anywhere else? It must be in the boy before it can come out. The great singing voices are natural, not made. The call to be a leading business boy should be as distinct in the boy's personality as the call of another to surgery or exploring. What, then, are the personality signs that point out the boy who will "get along?"

We should say, first, the overpowering, overmastering desire to climb this particular ladder. The stream flows better down hill. No great success was ever achieved by one indifferent to the path thither, or who could go any other way. This means the business instinct, the bent this way—so positively that no other way will marshal all the boy's inward force. This is fundamental—this starts the boy right; and the rest is impulse, training; growing delight in one's work, the white heat of enthusiastic satisfaction that the path is entered; then the glitter and excitement arises, the pace quickens, the faculties expand.

You have seen the hunter's dog—absorbedly, exactly, quietly he runs, when all at once he strikes the scent; and up goes the whoop of delight. It becomes now only a matter of time. With equal interest, with equal quivering, excitement and delight must the boy's work be in his special field, if he will reach the first rank. It is not primarily or mainly the money at stake, but the zest, the best exercise of the faculties possible. This way only, and no other way, will make the boy "get along."

This start, this glad start, should be made as early in life as possible. To get along the boy should get under way and under impulse while yet young. Most of the original work in all lines is done by young brains. This is shown by so many of the writers of our time. Dickens wrote his best books before he was thirty. Emerson, the great American philosopher, only repeated himself and said his old thoughts over again in a new dress after he was forty. Tennyson is said to have written best in his thirties. There is a quality of growth—when one is developing along his peculiar line—in youth that doesn't come later. Fertility, invention, vitality, are the fruits exclusively of youth.

Young brains in business are eager, susceptible, fond of impulse; they relish novelties, changes; the wax is not set—is still soft; and the impression of the times and circumstances more certain.

Another thing is to draw oneself together and prepare for a long do or die campaign—one of not shorter than twenty-five or thirty years. The preferences won't come sooner; they should not—for the boy's own good. The get-rich-quick is not of this type. The true business boy in-

stinctively will divine that he must lay his foundations well, and this takes a long time. If it is too great a sacrifice, if it seems too long, too little worth the long, arduous struggle, than it can be seen beforehand you are of the business none-elect. This also means that you early divine your purpose, your mission, and then—no change. Seek the right line and stay in the same path and bide the twenty-five or thirty years' time.

Then, and invariably, the technique of your chosen calling must be mastered. One's body should be kept in condition to have the brain do its best. This is not athletics, but training. Go to the theatre; notice how much more expressive are the features and the movements of the actors than those of ordinary people. This is training. Go to the circus and note the tight-rope walker. See him later ride two horses. See him jump the hoops with such ease. These things, so easy to them, are simply impossible to you. This is training. Go to the opera and hear the prima donna or the tenor sing three and four hours "on a stretch" in a hall hundreds of feet high, deep, long and wide. Where you could not be heard for five consecutive minutes, these people will sing for hours with seeming ease. This is the result of training in their technique. It is having oneself well in hand. So must the business man have his technique. The technique is bigger than the man and will tax his best faculties working at high speed. If he is the elect boy, he will master it all.

This technique must be largely absorbed. It cannot be taught in schools. It is incommunicable. You get it or you don't—as you succeed or you fail. It comes day by day, little by little. You cannot coach for it. You cannot exclusively read up to it. It must come from the boy's juxtaposition with events, and his appropriation of their teaching. The dizzy path trod by the leaders is only trodden by trained and tireless feet.

The excitement of this growing knowledge and capacity is intense. It thrills one's nature. It gives the growing boy command of himself and consequent command of others. It is the delight of life, this play of all the faculties; and the opportunities, like battalions, hunt for a man of this temper. You know what Mr. Carnegie said—that he pitied the man who could not find the romance and thrill of being in his business.

Another detail of success is boldness, and this comes of youth and this temper of spirit. Excited, thrilled, all faculties awake, gathering equipment from all surroundings, how could one be timid? Hence, by this law, the industrial captain is always bold and fearless. He treads with definite, certain feet. This overmastering boldness must have its own way; it refuses other direction. Thus comes the master's spirit, and the master always rules—both himself and others.

But alas for those who fail, who fall out of the race, the non-elect. It means lack of manhood, lack of quality; it means opportunities not discerned. The details are these: Shirking of work, neglect of gathering the equipment, not thinking things out to the end, lack of interest, wasted opportunities. Your ships pass in the night—a final loss of the race.

I end as I began. Not all American boys will "get along."

Some will be of the elect, and some will fall by the way. But in all cases it all remains with the boy himself. His destiny remains exclusively in his own hands. When he brings his unused talent and says, "I was not as well started as others," the inexorable judge will say: "No excuse; take his one talent away, and give it to him who has improved his ten talents."

FAIRLY CAUGHT.

It touches the funny-bone to read in the *Boston Journal* of a New Haven grocer who amused himself at the expense of Mr. Isaac Bromley, a wit by inheritance, whose late father was the wittiest journalist of his time.

In company with his wife Mr. Bromley drove up to a grocery store in New Haven, but went in alone to give his order. He unrolled a long list of items and began to read them off. "And a box of stove-blackening," he concluded, with a sigh of relief.

The proprietor of the store was taking the order, and he owed Mr. Bromley a little practical joke account. "What color stove-blackening do you want, Mr. Bromley?" he asked, quietly.

Mr. Bromley looked thoughtful.

"Why, I don't know," said he. "I'll ask Mrs. Bromley."

He went out to the carriage, opened the door and poked his head in. "What color stove-blackening do you want, my dear?"

Mrs. Bromley looked at him. Then, over his head, she saw the convulsed face of the storekeeper, and her eyes sparkled with understanding—and sympathy.

"Use your own judgment," she said politely over her husband's head. "Mr. Bromley will be satisfied with any color blackening you send." Then she added, sweetly: "Hadn't you better get in now, Ike? As we drive along we'll think it over."

DIXON'S FACING NO. 6726.



In this facing the graphite or plumbago used is the Ticonderoga brand, and is the most refractory graphite that exists. What we mean by refractory in this case is, that if a certain amount of Ticonderoga graphite was put in an open crucible and burned until the carbon was all exhausted, it would require two or three times as much time as would be required to burn the same amount of Ceylon plumbago.

It is specially prepared to meet the requirements demanded for a strictly high grade green sand facing, where the quality of the finished casting is the thing sought after. It is similar to Dixon's well known 2441, but contains more binding material and will therefore adhere to a dryer surface than Dixon's 2441.

One of our customers writes as follows concerning it:

"You will find by referring to your records for 1902 that these works used between 55 and 60 bbls. of this facing, and have been using it at about the same rate during 1903.

"We would state that we have always found this facing to be an exceptionally good facing and, unless something better turns up, we will continue to use this facing."

CLEANING STEAM BOILERS.

By W. H. WAKEMAN.

The most disagreeable job that the engineer of a small steam plant has to do, provided he does it well, is to clean his boilers. It is hot, hard and dusty work, therefore it is sometimes postponed longer than good practice admits.

The fact that, as a rule, the time that can be spared for such work is short, tends to make it more disagreeable, because the boilers and their settings are not cool. It is safe to say that many boilers are badly strained by unequal contraction during the cooling process, therefore a few suggestions will be made on the subject, which will prevent the trouble mentioned, if they are adopted.

It should be remembered that a boiler ought to be cooled evenly, for if this is accomplished it may be cooled quickly without damage.

Where the time is very limited, all of the steam should first be allowed to escape to the atmosphere, if it cannot be used for a good purpose. Assuming that it is a tubular boiler fitted with an internal feed pipe, some of the water may be run out of the blow pipe, and cold water run in un-

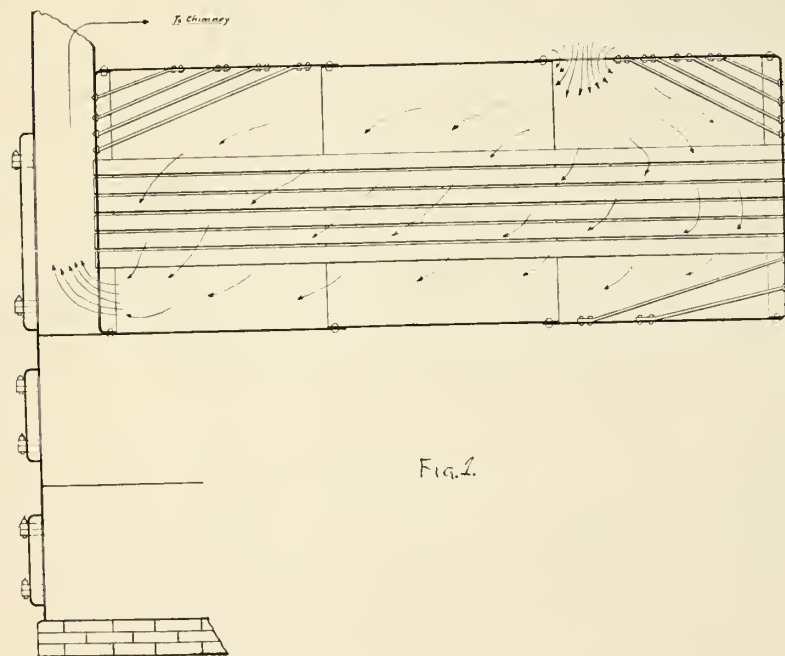


Fig. 1.

til the water level reaches the third gage. This should be repeated, say, four times, each time allowing more hot water to escape than previously, but always filling up to the third gage. All of the water may then be allowed to run out.

After the boiler is known to be free from steam and water, the top and bottom manhole covers should be removed; then close the furnace and ashpit doors and open the damper. This will cause cold air to rush into the top manhole, circulate around all of the tubes, touch nearly all parts of the heads and shell, then escape through the bottom manhole as illustrated in Fig. 1.

After air has circulated in this way for one hour or more, according to the time that can be spared for it, a hose nozzle may be put in the top manhole, and the whole interior thoroughly washed out. The bottom manhole cover may then be replaced and water run in until it shows at the sec-

ond gage, after which the top manhole cover may be put in and the boiler is ready for service again.

While it is not practical at this time to describe the process of cooling off all of the various kinds of boilers now in use, it is well to emphasize the fact that the same important principle applies to all, for they should always be cooled as evenly as possible.

The first time that I tried to clean a tubular boiler, I did not know how to do it. The difference in engineers, in this respect, is that while some of them do not know how at first but soon learn, others do not understand what is wanted after they have done it a hundred times. A man is not to blame for being born unwise, but he is guilty if he always remains ignorant.

The first time that I removed a manhole cover, I tore the gasket into several pieces and spoiled it as illustrated in Fig. 2. This was due to the fact that nothing was put on it, therefore it stuck to both cover and boiler head with various degrees of tenacity; so, of course, it came off in pieces.

If an engineer has several more gaskets on hand, it is bad enough to ruin one of them needlessly; but if it is the last one he has and the stores are all closed so that he cannot get another, it may cause him serious trouble and his employer several dollars.

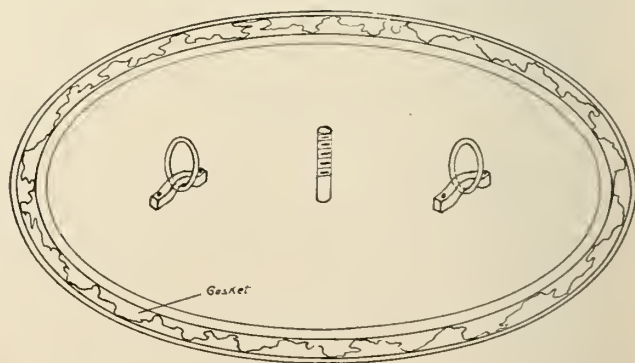
This was my case exactly, and it will take me a long time to forget all the chagrin and annoyance caused by the accident. After this experience I learned to put the gasket on the cover; then smear the upper side with Dixon's Graphite mixed with cylinder oil; also to cover the inner part of the head (where the gasket comes in contact with it) with the same preparation.

After that, when I took a manhole cover out, the gasket always stuck fast to the cover but came off from the boiler head freely.

How many times do you suppose did I use the same gasket? Well, it came off so nicely and fitted into place so easily when put back, that I kept an account of the number of times it was replaced, until I got tired of using it and wanted to see how a new one operated, for I began to think that the old one would never wear out. After using it ten times

I cut it off and threw it away.

Let us put down a few figures relating to these facts and note the result. At that time those gaskets cost about



\$1.00 each, and are worth about 75 cents now. I used one gasket and say 25 cents' worth of Dixon's Graphite to pack

that manhole cover ten times. Total cost, \$1.00. With nothing on the gaskets to prevent sticking, it would have taken ten gaskets, at 75 cents each, or \$7.50. Difference in favor of Dixon's Graphite is \$7.50, less \$1.00, leaves \$6.50, which is a very large percentage on amount invested. Perhaps some expert mathematician will make the necessary calculation and inform us of the exact percentage. It does not require figures to show that it is worth while to save \$6.50 on one boiler for packing one head in one year.

There is another incident relating to this useful and inexpensive material that I must relate, as it is interesting and, like others stated, it is strictly true, for none of them are fancy sketches:

While sitting at the desk in my engine room, writing down a former experience with graphite, one of my duplex hot-water pumps began to groan.

How exasperating it is when a fellow desires to have things run smoothly while he writes a letter, to have a pump, that is only a few yards distant, send out unearthly groans and moans.

It is well to keep an even temper in such a case, if possible, and apply a remedy at once. This pump is fitted with a good sight-feed lubricator and there is a common brass oiler on the steam chest. A few spoonfuls of graphite was mixed with cylinder oil and put into this oiler. The result is, that while I am writing this letter that pump is so quiet that I have looked to see if it is running. It is and has been working all the time I have been occupied in writing this letter, but you could not tell, unless you saw it, and nothing else was done to cure the trouble except to use graphite as described. Of course, this result is not unusual, as it is to be expected every time; but I mention it as a matter of interest to engineers and steam users.

IN PURSUIT OF THE BEST PENCILS.

(Copy of a Letter received by us from a National Bank.)

The Dixon Pencil Co., Jersey City, N. J.:

KIND SIRs

I am in persuit of finding the place where the best pincils are made you know that meanes a great deal i have ben trying to get your no. 219 -american graphite.artist . v.v. h — hhhhh. pencils I asked all the dealer s heare and they dont seame to wanto get them for us in the bank and we must have them sas they are avery hard penel and that is the only kind that we can youse for journal work as all the other pencils are all to soft the kind that i mentioned to you they carry a needle point so know if you think that you fully under st and. the kind i want please and send me one dozent by mail at once eather send them to me direct ore to some dealer. but you might just as well send them to us direct as we must have them and the dealers dont seame to wanto cary them in stock as there is little sale for them o out side of our business so please and send them at once fore i only h ha ve a little sub yett i have ben at our dealers forover two weekes and havent got them yet you nedent feare that you wont get your money we will send you the money as soon as we get the pencils and if you dont wanto send them direct ore bill them direct .send them direct and bill them through a jobber but at ennyrate send them will be pleased to heare from you at once.

Truly yours, ML — — —

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequalled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

THE MAGICAL NUMBERS.

As we haven't seen the following table in print for a long time, our readers may welcome it.

Outside of the trick and fun in it the wonder is how the originator of it went to work, and wherein lies the secret; possibly some of our readers who are mathematicians will tell us.

Request a person to find in what columns his age is indicated. You can at once then tell him what his age is. You can tell any number under 64 by means of this arrangement of numbers.

| | | | | | |
|----|----|----|----|----|----|
| 1 | 2 | 4 | 8 | 16 | 32 |
| 3 | 3 | 5 | 9 | 17 | 33 |
| 5 | 6 | 6 | 10 | 18 | 34 |
| 7 | 7 | 7 | 11 | 19 | 35 |
| 9 | 10 | 12 | 12 | 20 | 36 |
| 11 | 11 | 13 | 13 | 21 | 37 |
| 13 | 14 | 14 | 14 | 22 | 38 |
| 15 | 15 | 15 | 15 | 23 | 39 |
| 17 | 18 | 20 | 24 | 24 | 40 |
| 19 | 19 | 21 | 25 | 25 | 41 |
| 21 | 22 | 22 | 26 | 26 | 42 |
| 23 | 23 | 23 | 27 | 27 | 43 |
| 25 | 26 | 28 | 28 | 28 | 44 |
| 27 | 27 | 29 | 29 | 29 | 45 |
| 29 | 30 | 30 | 30 | 30 | 46 |
| 31 | 31 | 31 | 31 | 31 | 47 |
| 33 | 34 | 36 | 40 | 48 | 48 |
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| 55 | 55 | 55 | 59 | 59 | 59 |
| 57 | 58 | 60 | 60 | 60 | 60 |
| 59 | 59 | 61 | 61 | 61 | 61 |
| 61 | 62 | 62 | 62 | 62 | 62 |
| 63 | 63 | 63 | 63 | 63 | 63 |

Here is the secret. When you learn what columns the number is in, simply add the numbers at the top of each column and the trick is done.

OIL AND GRAPHITE FOR AIR CYLINDERS.

A Letter That Should Interest Every Engineer and Which Should Command the Attention of Everyone Interested in Efficient Railway Service.

"I have been using Dixon's finely pulverized Flake Graphite, No. 635, in air cylinder of air pump with most satisfactory results.

"I mixed about a tablespoonful with half-pint of cylinder oil and put it in squirt can, and have been giving the air cylinder (through oil cup) about half a teaspoonful in twenty-four hours. Of course, I keep the contents in the can well shaken up.

"Before I used the graphite, pump was running hot and groaning and squeaking all the time. Since using the graphite and cylinder oil in the manner mentioned, I have not heard a groan or a squeak, and the pump runs cool and will pump all the air wanted at any time."

Samples free to those who are interested.

THE UNION FOREVER.

The week of January 3rd to 9th was bitter cold—mercury 10 below—and very snowy. We were building a large brick extension. The poor contractor was trying to get his work done. Four days, on account of cold and snow, the bricklayers could not work. Saturday, January 9th, was a fine day—brilliantly clear and temperature just right for good work, but at 12 noon, the bricklayers quit because the union forbade work Saturday afternoons; so the only fine half day of the week was thus wasted. This is what the union dictated. We wonder whether this was what Daniel Webster had in mind when he said, "The Union Forever!"—JOHN A. WALKER.

IT MAY BE TRUE.

One of Sam Mayer's friends tells us that when Sam was a boy looking for something to do he saw the sign, "Boy Wanted" hanging outside of a store in New York. He picked up the sign and entered the store. The proprietor met him.

"What did you bring that sign in here for?" asked the storekeeper.

"You won't need it any more," said Sam cheerfully. "I'm going to take the job."

The Ghost in Man, the Ghost that once was Man,
But cannot wholly free itself from Man,
Are calling to each other thro' a dawn
Stranger than earth has ever seen; the veil
Is rending, and the Voices of the day
Are heard across the Voices of the dark.
No sudden heaven, nor sudden hell, for man,
But thro' the Will of One who knows and rules—
And utter knowledge is but utter love—
Æonian Evolution, swift or slow,
Thro' all the spheres—an ever opening height,
An ever lessening earth.

—TENNYSON.

THE INTERLOCKING of the microscopic roughness of the rubbing surfaces causes friction.

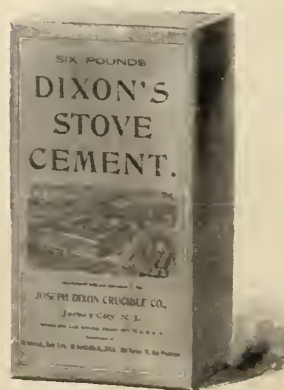
The cure is to fill up these irregularities and make the surfaces perfectly smooth.

Dixon's Pure Flake Graphite will do this, furnishing a hard, glossy surface of exceeding smoothness. For this reason, Dixon's Flake Graphite deserves a place wherever rubbing friction is to be overcome.

A HANDY ARTICLE.

Made of Best Fire Clay and Graphite.

Handy alike to the stove repair man and the stove user. Useful to any one having stove bricks or linings that occasionally need repairs. Mixed with water it becomes a plastic cement useful for filling all cracks and breaks in stove and furnace linings.



Graphite

VOL. VI.

JUNE 1904.

No. 7.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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DIXON'S WIRE ROPE GREASE.

By R. A. BROWN.

The condition of a rope for the best results, should be free on the outside from any tar or other coating. To begin with, when a rope is new, a manufacturer will probably have filled it, if it has a hemp core, with some coating of his own, which usually included graphite. Amongst English manufacturers of steel cables for hoisting, it has been acknowledged for a long time that a rope is better laid upon a hemp center. This, however, is not always done, as many ropes are made on the requirements of the people who are going to use them. Taking a rope when it is new, and allowing it to take up as much pure graphite grease as it will from passing over a slotted box or any means which itself suggested at

the time of putting it on with convenience, it will gradually fill from the outside until it will find its way around every strand, and find lodgment in the center.

Once a rope is filled this way, it will then offer the least wear to the strands when passing over the sheaves. In mines carrying very heavy loads, as on two compartment shafts, there is a great deal of pressure and friction upon that section of the rope that is at any time on the outside of the sheave in passing over. That is where many practical rope men believe the greatest wear takes place, and that is where Dixon's Wire Rope Grease gives off its greatest benefit.

In mines having very bad water, containing acids, the action of this water on an unprotected rope would cause oxidization, and if not attended to will commence its work of disintegration. Once this oxidizing commences on the inner strands, it is then impossible to remedy it by any subsequent covering from the outside, and from the time that oxidization commences, the tensile strength of the rope commences to decrease.

When a rope is covered in this manner an additional fifty percent to its life, above the normal, is obtained.

In covering a rope with any preparation containing low grade plumbago, no benefits are obtained from the proportion of plumbago that is in the general mass. This low grade stuff always carries impurities in it which are

associated in the formation of the mine from which it comes, and impossible to separate. These impurities are usually gritty substances like the country rock or walls from which the graphite is taken, the whole mass is discolored by the presence of the plumbago in it, as for instance a little ink will discolor a large quantity of clean water. By this means, many are deceived in the use of cheap plumbago for any lubricating purpose. The impurities become dry and crack as earthy matter will, and perish soon, leaving no results from the little plumbago in the mixture. If there are any sulphuric acids in mine water it is imperative that *pure* graphite should be used in the grease, for the mine ropes. Pure graphite in other ways is known to withstand the action of many acids. Once properly filled by Dixon's Wire Rope Grease, it requires little attention afterwards to keep a rope properly covered, the usual greasing the work requires being quite enough.

Many coal mines, copper mines and gold mines where the water is exceptionally bad, give evidence that Dixon's Wire Rope Grease has proven the very best ever offered for this service.

AMERICA AND THE INDUSTRIAL DEVELOPMENT OF THE WORLD.

America has a great destiny to perform in the industrial development of the world. She can perform it only by applying to every part of the machinery of production, transportation and exchange the principle of the greatest economy of effort to obtain the greatest sum of results. The opportunity for every man to rise by his talents from the lowest to the highest place, the right to reap and hold the rewards of one's labor without excessive taxation or vexatious visitation, the privilege of transferring property on the stock exchanges without the fetters imposed on such transactions in Europe, and the freedom to extend new methods of economy and combination in trade and finance across the continent, untrammelled by local tariffs and state boundaries, are among the weapons which give our country its great advantages in dealing with older competitors.

—Science.

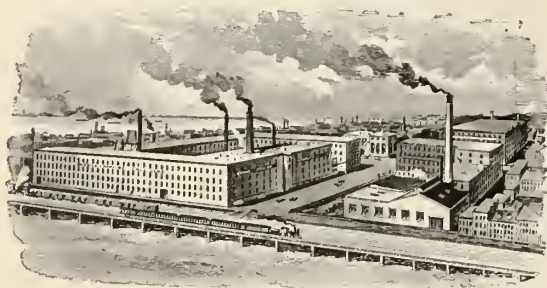
A GOOD STORY.

From "Uncle Dud."

A travelling man died on the road, and a friend wired his house asking for instructions as to what to do. The firm wired back—"Search him for orders—Ship his samples back to New York and notify the police to take care of his body."

ESTABLISHED 1827.

INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

BRANCHES AT

68 Reade St., New-York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Pittsburg, Paris, Hamburg, Vienna,
Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen,
Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., June 1904.

BOILER SCALE.

To prevent the solid attachment of boiler scale to boiler plates, a coating patented in Germany by J. Smit, Leenwarden, Holland, is said to prove effective. About equal proportions of train oil, horse tallow, mineral oil and zinc white, are thoroughly mixed with a portion of graphite and lamp-black, water and some carbolic acid being added until a paintlike consistency is obtained. For instance, we use 1 kilo train oil, 1 kilo horse tallow, 1 kilo paraffin, 1 kilo very finely ground zinc white, 1.5 liter of rain water, 4 kilos of graphite, 1 kilo of lamp-black, and 0.1 liters of carbolic acid. The horse tallow combines with the zinc oxide to produce a strongly adhesive soap, very hard to melt. The paraffin prevents the penetration of the feed water, and consequently of the scale. The lamp-black and graphite lend the necessary consistency. The boiler scale can be detached by simple tapping with a wooden mallet.

—*Brewers' Journal.*

AN INTERESTING CASE OF CHAIN LUBRICATION.

A correspondent writes us:

"I have used Dixon's Graphite for many years and keep it 'ready' all the time. I know of one use for it which I have never seen any account of.

"At a place where I was employed, they had a pneumatic crane which was used very much, its principal duty being loading and unloading car wheels and axles—a pair of wheels in position on the axle. A chain was used for a

hoist. This chain was made up of half-inch round iron and had to pass around five sheaves and they were obliged to put in a chain every three months.

"The foreman asked me if anything could be done to stop the wearing away of the chain so rapidly. I advised him to mix Dixon's Graphite with light oil, so it would flow freely and apply it with a paint brush liberally, and this was done, and the last I knew of it the chain had lasted two years and the man who cared for the chain was happy."

Those in the past who used Dixon's Cycle Chain Lubricant and those of the present day who are using Dixon's Graphite Compound for automobile chains, know of the great value of graphite as a chain lubricant.

MEXICAN VS. AMERICAN GRAPHITE.

The other day a dealer in engineers' supplies said to a Dixon representative that a certain engineer complained that his graphite was not working right and was playing the mischief. The dealer took the engineer's word for it that it was Dixon's, but the Dixon representative had a talk with the dealer and the dealer then found out exactly what graphite the engineer was using and found that the man was using Mexican graphite. The engine was running hot in its bearings and indeed there was trouble wherever the Mexican graphite had been used. The engineer took the sample of Dixon's Graphite the dealer had offered him, experimented with it for a little while and found that it cooled the bearings and within a half hour everything was running nicely.

This reminds us to say that some twenty years ago a certain party tried to market what is known as German graphite, an amorphous graphite in which there is a large percentage of clay, and a graphite very similar in appearance and in nature to the Mexican graphite.

The German graphite caused a great deal of trouble and made a strong prejudice against the use of graphite for lubricating purposes.

Dixon's American Flake Graphite is a thin, tough flake of marvellous smoothness and toughness. It forms a veneer-like coating on the bearing surface, prevents cutting and is the best solid lubricant known to theory or practice. The Mexican and German graphites form a mud-like paste, possessing the smallest amount of lubricating value and containing sufficient grit as a rule to ruin most bearings to which the paste is applied.

"TIC-A-TOC" AND GRAPHITE CUP GREASE.

We are frequently asked in letters if we make a high grade grease compounded with Dixon's Graphite which will make an excellent lubricant for engine crank pins, which are difficult to keep cool.

The Dixon Company is using what is known as the "Tic-a-Toc" cup made by Messrs. James L. Robertson & Son of New York City, with Dixon's No. 2 and No. 3 Cup Grease mixed. For economy and efficiency we know of no better combination, and our engineers would not for a moment think of returning to the old system of oil cup and oil.

PHILADELPHIA BRANCH OF THE JOSEPH DIXON CRUCIBLE CO.

The Joseph Dixon Crucible Company, of 1020 Arch street, has again been compelled to enlarge its quarters and increase its facilities. It has taken part of an adjoining building, and in addition has completely remodeled its office and salesroom; and for convenience and general attractiveness the place of business is now unsurpassed by any wholesale house in Philadelphia.

The extraordinary success of the Philadelphia branch of this company deserves more than passing notice. Not so many years ago, a small store and three individuals were sufficient to carry on the business. At present, it takes a large corps of bright and active young men, with a large office and salesroom. This branch is under the supervision of a Philadelphian, William J. Coane, to whose progressive management Philadelphia owes the rapid growth of this business.



WILLIAM J. COANE.

The Dixon Company is the inventor of the Black Lead Crucibles, but it is better known to the general public as the manufacturer of the world-famous Dixon's American Graphite Pencils and the celebrated Dixon's Silica-Graphite Paint. It manufactures graphite products for every known purpose, and throughout the civilized world there is hardly an industry, or man, woman or child that does not use its products in some form. It is the largest concern in the world of its kind, the factory plant in Jersey City covering $3\frac{1}{2}$ acres and consisting of 22 buildings. Aside from this it owns its own graphite mines in Ticonderoga, New York, which are well known to the scientific world for the unrivaled quality of flake graphite they produce. At Crystal River, Fla., it has large cedar mills, which prepare the wood for its pencils. It has branch offices in Europe, Asia, Africa and Australia.—*The Philadelphia Real Estate Record and Builders' Guide.*

HE POLISHED THE NAILS WITH DIXON'S STOVE POLISH.

In his "Reminiscences for Hardware Men," at the banquet of the Nebraska Retail Hardware Dealers, Mr. Euclid Martin told how he treated a keg of nails that had been soaked in water "until there was simply a keg full of red streaks of rust." He said:

"Now, in those days the price of a keg of nails was an important factor to me, and I did not want to lose so much. I therefore decided to black them. I emptied them upon the floor and proceeded to mix them up with Dixon's Stove Polish, after which they were put in the nail bin with other ten-penny nails and weighed out in small amounts to customers. About the time the nails were all out my customers commenced coming in with packages of nails, saying "those nails I got of you the other day were all greasy and they were of no account." I readily took them back and gave them other nails, and it seemed to me before these nails were finally disposed of that I had weighed out and exchanged a carload of nails. The joke was too good to keep and was told by myself and got into the local papers, and finally ended up with the story that I had one of my clerks polish the entire keg of nails one at a time."

GRAPHITE CLASSED WITH GOLD.

The engineer in charge of a large drawbridge across the Harlem River, New York City, pointing to a 10 lb. can of Dixon's Pure Flake Lubricating Graphite, said to a Dixon representative, "that red labeled can from your Company contains "black gold"—every engineer treasures it above all other engine room supplies. Ten years ago I used it with uniform satisfaction in the lubrication of cylinders. I mix it with linseed oil for plastering the caps of boiler tubes, and never have a leak. I also use Dixon's Graphite Greases and Dixon's Silica-Graphite Paint on the boiler fronts and the stacks, and they give most excellent service. All of your graphite products for the engine room can be depended upon by reason of their perfection in quality. The use of the "black gold" saves the commercial gold for my employer."

PEN AND PENCIL.

"I," began the pen on the reporter's desk, "I am mightier than the sword. Of what use are you, pray?"

"Well," replied the editor's Dixon blue pencil, "to make a long story short."—*Philadelphia Press.*

SET THE RIGHT MAN TO DO THINGS FOR YOU.

"If you want a thing well done you must do it yourself." This was once a popular proverb, and it may have been a very wise rule at some remote period. But it won't work now. It has outlived whatever usefulness it may have had. It cannot be successfully applied in this age of big combinations. It would be fatal to all great modern enterprises. In fact, it never could have had any more than a limited application since the days "when Adam delved and Eve span." To be of any use at present it should be amended to something like, if you want a thing well done you must get some one who knows how it should be done to see that it is done properly.—*Retailer and Advertiser.*

ALL PENCILS AND NO INK.

According to *People* of Philadelphia, ink became a scarce commodity in the colliery offices of the Susquehanna Company on the first of the year. An order was made replacing ink with copying pencils which, it is said, are now used for all clerical work.

PLUMBAGO IS WHAT?—

Misrepresentation Might Be Misleading.

By F. S. H.

Once a verse was written—somewhat as follows:—

“In the days of the Ichtyosaurus,
Those wonderful days of yore,
When the air was C-O-two,
And water, H-two-S-O-four.”

Graphite may have occurred even under worse conditions when the only “graft” in sight was a quarter in the moon.

The air, heavy laden with carbon dioxide, fit only for saurians and trees, with old ocean hot and “riled up,” and possibly full of Epsom salts, is it any wonder that old carbon was king and the diamond his queen, while graphite, a refractory prince of the royal blood, was a chip of the old block?

No matter what Hoyle says, we always find graphite, alias “plumbago” and “blacklead,” standing ace-high at the court of king carbon and queen diamond, with soot and charcoal as right and left bowers respectively.

We would like to include coal, but he’s a joker—sort of a hybrid full of hydrocarbons, and really not so pure a breed as charcoal.

For the sake of what’s coming, let’s call graphite plumbago.

The origin of plumbago might better be understood were it possible to go back a million years or so. What’s the use—our lungs wouldn’t stand it!

There is a vague impression that decayed vegetable matter had something to do with it (canned goods were unknown); that it was produced in a manner analogous to anthracite, but through greater heat and pressure became transformed to nearly pure carbon.

We know that graphitic carbon can be produced in other ways, as from a hydrocarbon gas like acetylene; or by segregation of carbon from cast iron; or by transforming coke in the electric furnace.

Hence, the diversity of opinion, although, now-a-days, scientists are trying to explain the origin of things by putting all the blame on radium.

It’s a downright shame to compare a brilliant, black, opaque substance like plumbago with the beautiful, transparent, crystalline diamond.

Certainly, no gentleman would offend his lady-love by offering a plumbago engagement ring in lieu of a Maiden Lane “Sparkler,” although plumbago, especially in thinly laminated forms, may be just as pure in carbon as the diamond.

Scientists state that the diamond when ignited in a current of oxygen will burn brilliantly with the formation of a gas known as carbon dioxide—the same kind of gas which produces the froth on beer or the bubbles in vichy and seltzer; and that the *ash*, consisting mostly of silica and ferric oxide, which is always left, varies from 0.2% to 0.05% of the gem.

Practically the same thing occurs when we burn or oxidize the purer forms of plumbago. At least one specimen in the Dixon laboratory assayed 99.8% carbon, the ash being hardly visible to the naked eye.

Somebody has had the nerve to state that plumbago “is not so pure as the diamond”—but that “the diamond, nevertheless, is changed into plumbago when subjected to the intense heat of a galvanic battery.” It is assumed that no matter how hot the battery becomes, the change takes place without imparting any impurity, since the diamond cannot impart that which it does not possess.

And thus, we are constrained to believe that plumbago may occur just as pure as the diamond, and every time a customer buys a Dixon crucible he is getting diamonds in another form.

If we could only reverse the reaction and recover the diamonds from the plumbago, what a demand there would be for old pots!

Plumbago incombustible? Oh, yes! In comparison with coal!

A plumbago crucible will outlast forty different coal fires—but then crucibles do gradually wear out through oxidation and rough treatment, so that the demand for them usually taxes the supply.

Of course, plumbago occurs widely distributed—Ceylon, Mexico, Canada, Siberia, Japan, say nothing of Ticonderoga and Jersey City. Some of it may even repose in the depths of old ocean.

It is found in the backbone of our continents, in the oldest rock formations—much older than the coal measures—and has withstood the ravages of time, a fact which proves its remarkable stability.

With its sub-metallic lustre and unctuous properties it should not be mistaken for coal.

It happens that the name plumbago is derived from the Latin “plumbum,” meaning lead—because both substances produce a mark on paper.

But metallic lead will melt in the flame of a candle,—while plumbago fuses only in the terrific heat of the electric arc.

Incidentally, it may be remarked that a plumber is a man who is familiar with “plumbum” and candles, but who usually lacks an intelligent appreciation of the virtues of plumbago.

Mica is no friend of plumbago—simply a chance acquaintance. Whenever associated, the product is generally useless.

The Dixon product from Ticonderoga is remarkably free from mica and will average 85% to 90% graphitic carbon, which is the average for Ceylon plumbago.

The latter is, however, universally preferred for crucibles, and although certain specimens may attain a purity of 98%—yet, a careless manufacturer, indeed, is he who would permit any “oversight” in his factory on that account.

It may not be amiss to state that the Dixon Company is producing the best all-round crucibles on the market to-day.

Other manufacturers appreciate this fact keenly and are forced to advertise their goods twice as much. One prominent concern in hasty fashion resorts to a wild flow of rhetoric, a regular symphony in prose, claiming that their crucibles “express the maximum amount of strength in make-up, and practically never “skelp””—a perfectly safe statement to make.

As a rule, crucibles express a minimum amount of poetry and motion, and only a lively crucible could "skelp."

If the word "skelp" means to kick or run or bound, then the Dixon pot has accomplished these feats.

1st.—It has kicked other pots out of the market.

2nd.—It always runs well in quality and number of heats—a saving "in the long run."

3rd.—It has bounded into popular favor as the most economical pot on the market to-day—economy in time, fuel, metal, and ultimate cost.

Lo! The poor Indian, he can both skelp and scalp!

But, the Dixon crucibles *rarely* "scalp," as the expert potter might say when speaking of clay ware, the surfaces of which sometimes flake off through unequal expansion.

And thus, the manufacture of plumbago crucibles has become one of the most important branches of the ceramic industries, requiring the best workmanship and the most careful selection of raw materials.

But, what of the Ichtyosaurus—

Who lived when the earth was all porous?

He fainted with shame

When he first heard his name,

And departed a long time before us.

PRACTICAL POINTS ON PIPING.

By W. H. WAKEMAN.

To the casual observer it seems to be a very simple matter to lay out a job of piping, then to screw the pieces together and put them in place, but it is not always as simple as it appears. Appropriate sizes of pipe and the right kind of fittings and valves to give the best results in practice must be selected.

A good steam fitter seeks to make tight joints on all the steam pipe he puts up, but as a rule he makes no calculations in regard to taking down those pipes, but the engineer in charge of a steam plant knows that in some cases at least, he must take down lines of steam pipe in order to make changes and improvements, therefore he tries to make the joints in a way that will admit of taking them apart without breaking the fittings.

The first time that I put pipes into a shop for steam heating purposes, I used nothing but oil on the threads, and when tested there was not a leak on the job. The philosophy of this is that as the threads were well lubricated, friction was reduced to the lowest possible point, therefore as the pipes were forced into the fittings they made up "iron to iron", so that there was no chance for leaks. I did not expect to take them apart, and I cared little about who did have the disagreeable job, so long as I was not engaged in it.

Heat from the steam quickly drove out the oil, rust soon took its place, and when changes were to be made it was necessary to break the fittings, then buy new ones.

Several years ago I piped a portion of the plant now in my charge and as I intended to run it after it was finished, care was taken to exercise foresight in the matter. One indication of this was found in the fact that I secured a can of Dixon's Flake Graphite, mixed cylinder oil with it, and used it on all of the threads. The consequence was that when a pipe was screwed into a fitting it was thorough-

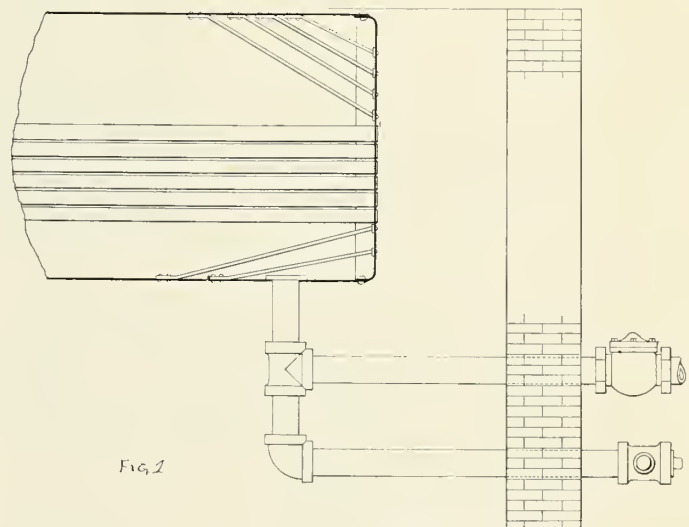
ly lubricated, therefore the wrought iron and the cast iron were brought together except that a very thin coating of the graphite remained between them to prevent corrosion.

When steam was turned on there were no leaks, and it is comparatively an easy matter to remove a pipe if it is necessary to do so.

After cutting off a piece of pipe with an ordinary wheel cutter, have you ever noticed how the area is reduced close to the end? On the job above mentioned, the end of every pipe was either reamed or filed until it showed the full area required.

Of course this was a tedious job, but you understand why it was done, do you not? Yes, certainly it was because I intended to use those pipes after the work was completed. It is not claimed that such work is necessary, for it is not, but it is better to have all pipes the full area called for. If a tapering reamer is used the labor is very much less than where only a half round file is available.

Unless graphite is used on the threads it is difficult to remove a steam pipe, but a hot water pipe, (say the blow-off pipe on a boiler) is nearly as bad, for it becomes corroded in places. The blow-off pipes on one battery of my boilers are four inches in diameter, as illustrated in Fig. 1. Each



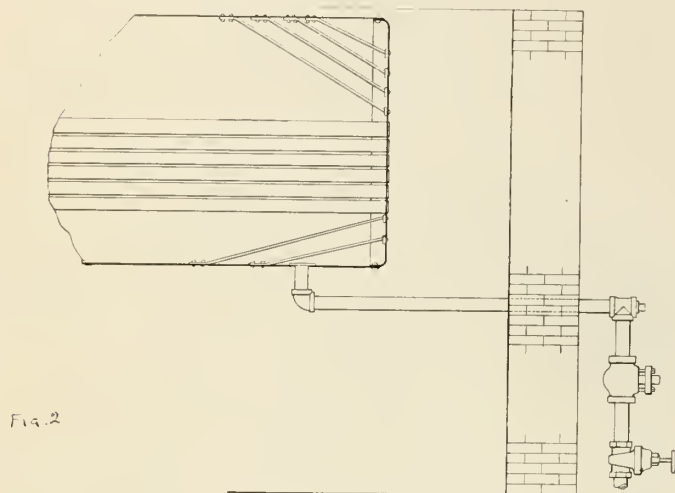
one extends down nearly to a level with the floor, then comes through the rear wall, terminating in a four inch reducing tee with a two inch side outlet. In the outer end of each tee there is a four inch plug, as shown.

It will be noted that the lower part of this large blow-off pipe forms a settling chamber into which impurities from the feed water find their way. When the blow-off valve is opened the greater portion of these impurities are blown out to the sewer, but still it is well to examine the inside of this pipe and see if scale is forming on it, as it is exposed to a very high temperature. For this purpose the plug must be removed; but if red lead had been used on the threads it would have been practically impossible to take it out; my favorite preparation, Dixon's Graphite mixed with cylinder oil, was used to lubricate the rubbing surfaces, and it forms a permanent coating that prevents corrosion, hence the plug can be removed with comparative ease. By inserting a candle in the lower part of pipe and looking downward from the inside of boiler, it is possible

to see the whole internal surface of the vertical pipe, and the horizontal piece can be examined from the tee.

The large check valve above this plug opens outward and forms part of a patented boiler setting that gives very good results.

The blow-off pipe shown in Figure 1 is of rather unusual



design, but Figure 2 shows a very common form. It is two inches in diameter and after it comes through the rear wall it is fitted with a two inch tee, having a plug in the outer end as shown.

The object of putting a tee here instead of an ell is to enable the engineer to remove this plug and thus gain access to the long horizontal pipe, for the purpose of cleaning it. If this pipe is neglected until hard scale forms on the inside, it is sure to be burned off sooner or later, because the fierce heat evaporates the water standing in it, and as the feed water does not enter this pipe it is soon destroyed.

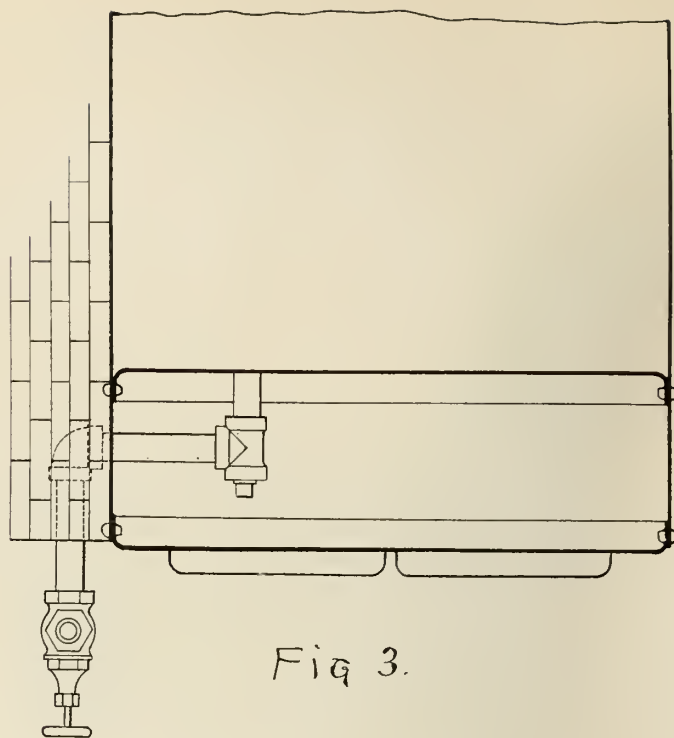
If red lead is used on the threads of this plug, it is very difficult to remove it and it becomes necessary to hammer the tee in order to loosen the plug. This is always a dangerous proceeding because it often cracks the fitting and this may not be discovered until steam is raised in the boiler.

As there can be no valve in front of this tee, and if there was it could not be shut in case of accident, it is not advisable to take any chances in the matter.

All of this danger is prevented by using Dixon's Graphite instead of red lead, for I have found that it makes it comparatively easy to remove a plug that has been so treated.

Figure 3 is a plan view of the front part of my tubular boilers. It shows a short piece of pipe screwed into the boiler head, followed by a tee looking outward, into which a plug is screwed. Another pipe is screwed into the side outlet of this tee, followed by an ell that is covered by the brick work, then a third pipe connects with the cross valve in the lower part of water column connection.

From this it will be noted that the plug is exposed to the action of very hot water on one side and the heat of escaping gases on the other. It has to be removed when the boiler is inspected and cleaned, in order to show the inside of this pipe, therefore something must be used on the threads to prevent corrosion. It is hardly necessary to state that I use Dixon's Graphite for this and that it answers every purpose.



The manufacturers of this graphite have a special preparation for use on pipe threads, and I am sure that it is all right, but these facts are given just as they occurred in my practice, and for years it has been my custom to keep a tin can of this article on hand and to use it for all suitable purposes as described in various articles which appear in this paper.

Another advantage gained by using graphite on pipe threads is that being a lubricant itself, if any of it finds its way into the steam cylinder of engines or pumps it will not cut or score them.

THE LEAD PENCIL TEST.

EDITOR *Power* :—

In reading the mechanical papers I have several times seen statements to the effect that a good test for smooth running of an engine is to get it down so fine that a lead pencil will stand on end on any part of it, but I have never seen any specifications of the dimensions of the lead pencil that should be used. One that is 8 inches long and $\frac{1}{4}$ inch in diameter will hardly stand on end on a table, and when I hear people tell about an engine running with so little vibration that a lead pencil will stand on end on it, I have visions of other lead pencils than the one described. A piece of the $\frac{1}{4}$ inch pencil, 3 inches long, passes as a lead pencil and would probably stand on end on a great many engines, while one $\frac{1}{2}$ inch in diameter and 3 inches long would probably stand up all right on "any old engine."

Anent the above the writer refers, very likely, to the lead pencil test made by the Winton people to show the steadiness and smooth running of the Winton automobile. We are advised that such a test was successfully shown and believe a regular Dixon pencil was used, and a full length one at that.



AN UP-TO-DATE METHOD.

We show herewith illustration of a huge crucible made by the Dixon Company for the Midgley Mfg. Company of Columbus, Ohio.

This crucible is used for brazing the Midgley tubular steel wheels and it represents an up-to-date development of the ancient art of brazing.

The crucible is the largest ever made by the Dixon Company and, we believe, is far larger than any crucible ever made before for any purpose.

PENCILS.

All lead-pencils have their uses, else they would not have been made. The use of some pencils is to sell them to those who do not know a good pencil from a worthless one. At the same time a good pencil, used for a purpose for which the maker did not intend it, may be a very worthless article, as for example a very hard and expensive drawing pencil used for making memoranda on soft paper. In order to get the right pencil into the right hands, the Joseph Dixon Crucible Company, of Jersey City, N. J., have prepared and published a pencil index describing the various kinds of pencils in the market and their special uses. You cannot think of a lead pencil question that it does not answer. Send a postal for one, and in doing so mention **SELF-EDUCATION** so that you may get a prompt reply.—*Self-Education*.

ENORMOUS DEPARTMENT STORE BUSINESS.

A Chicago store has shipped an entire church, complete from belfry to Bible, into the heart of Africa, on a simple mail order.

The transfer of cash from sales counters to the cashier's room in Macy's store, in New York, keeps in operation eighteen miles of pneumatic tubing.

The firm of Montgomery, Ward & Company has developed the mail order business to astounding proportions, forty-five girls, working ten hours a day, were three weeks behind recently in the simple act of opening the incoming letters.

John Wanamaker's Philadelphia store has under its roof the biggest book shop in the world, and has sold, in the past six years, ten million dollars' worth of an edition of a single work of reference.

The wagon delivery district of a certain New York store is over several hundred square miles in area.

Several years ago one day's receipts of Montgomery, Ward & Company passed the five thousand dollar mark. The other day the tabulated sheet at the close of a day's business showed

total sales of two hundred thousand dollars. Last year the sales sheets for the three hundred odd business days of the year showed average daily sales of sixty thousand dollars.

One store did a business last year of twenty-five million dollars, which is equal to the entire annual earnings of a great railway system like the "Big Four" or the "Wabash."

In Chicago one great merchant's gross annual receipts from a store combining wholesaling with retailing are forty million dollars.

On a Christmas-week day a quarter of a million shoppers enter a big store. To handle this immense business there are employed from five thousand to seven thousand persons.

The enormous growth of the department store business is the direct result of advertising—advertising that, by its volume and its distinctive type, has astounded the commercial world.—FRANK FAYANT in *Success*.

LINOTYPE GRAPHITE.

A linotype machinist writes us as follows:

"Replying to your letter of inquiry will say that I gave the samples of graphite a good test and found them fully up to your recommendation and at once placed order with Carpenter & Company. I find it far superior for cleaning mold mats and spaces. None other will do for me in future."

PRACTICAL LUBRICATION OF ENGINE CYLINDERS WITH GRAPHITE.

The use of graphite as a lubricant for engine cylinders and pumps has received so much attention that its value and economy for this purpose are generally accepted, but the problem which has confronted most engineers has been the difficulty of feeding it satisfactorily. A great many engineers who have been troubled with wet steam and the condensation washing the oil from their cylinders and valves, have found a temporary remedy in graphite used occasionally by hand, and probably most engineers have at one time or another resorted to its use when oil alone did not produce satisfactory lubrication. But the use of an excessive quantity of graphite at irregular intervals often produces conditions as unsatisfactory as those which it is intended to remedy, and the best mechanical and economical results can only be obtained by feeding the graphite at regular intervals and in quantities adjusted to the requirements of the engine.

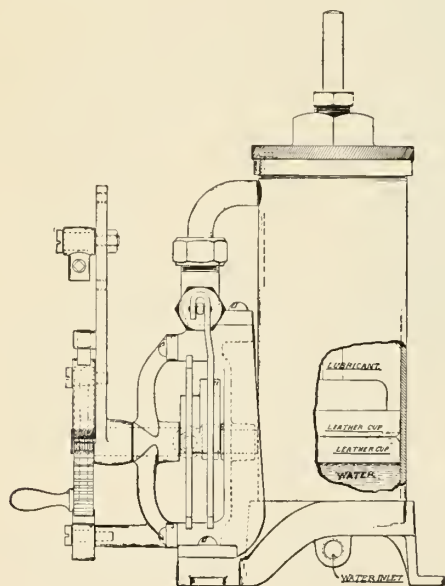


FIG. 1. SECTION OF GRAPHITE FORCE PUMP RESERVOIR.

For this purpose the Milwaukee Metal Working Co. has placed on the market a new pump or force feed lubricator which, it is claimed, will feed any lubricant from the lightest oil to the heaviest grease or mixture of graphite and oil. It feeds automatically, with positive force feed (which may be adjusted to the requirements of the engine) and without the possibility of accumulation or clogging at any point. This is accomplished by introducing boiler pressure back of the lubricant in the reservoir, Fig. 1, forcing the lubricant, even in the form of a heavy paste, to the pumping pistons, and by avoiding any form of check valves, or other points at which an accumulation of graphite might occur.

Fig. 1 shows the manner in which pressure, upon water of condensation, is introduced into the lubricant reservoir under a piston carrying double leather cups. This keeps the lubricant under constant pressure and forces it through the curved channel at the top of the reservoir directly to the pumping pistons. Fig. 4 shows these pistons about to

take in a charge of lubricant. The right hand piston, carried by the rear sliding frame, which in turn is operated by the larger part of the central double cam, travels independently to the right as far as the adjusting screw on this

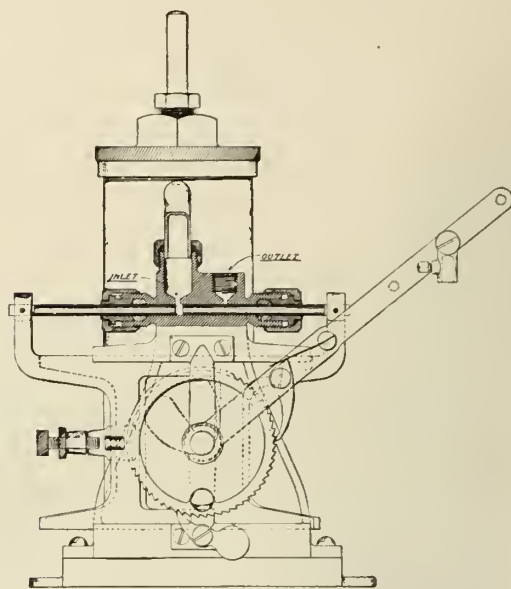


FIG. 2. VIEW OF RESERVOIR AND SECTION OF FORCE PUMP.

frame permits, and the space thus created between the pistons is filled by lubricant, under pressure, from the reservoir, Fig. 2. When the screw on the rear frame (seen at the left of Fig. 2) engages the front frame, the left hand piston, which is operated by the front frame, follows the

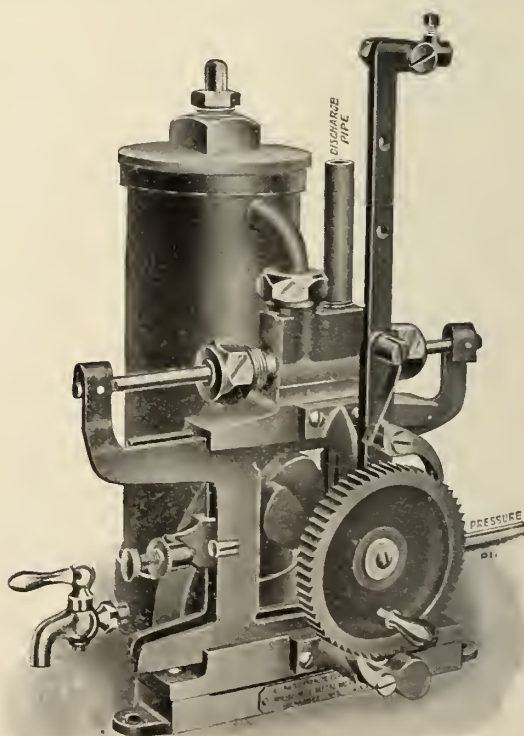


FIG. 3. ASSEMBLAGE VIEW OF PUMP.

right hand piston in its travel toward the discharge port, the two pistons remaining a fixed distance apart, Fig. 5.

When the discharge port is reached, the right hand piston remains stationary while the smaller half of the double cam engages the front frame and carries the left hand piston forward towards the stationary piston, forcing the charge of lubricant out into the discharge port, Fig. 6. The two pistons, abutting one another, are then carried back to the intake port and the operation repeated. No check valves are necessary, as the right hand piston closes the discharge port when the intake is open, while the equal pressure on both sides of the pistons effectually prevents any possible leakage around them.

While the lubricator has a positive pumping mechanism, this operates, practically, only as a measuring device, which takes a given quantity of lubricant under pressure at one point of the pump barrel and transfers it at practically the same pressure to another point. The lubricant, whether in the lubricator reservoir, between the pumping pistons, in the discharge pipe or entering the steam main, is always under practically the same pressure. What difference there is is caused by the decrease of pressure area on the upper side of the reservoir piston, Fig. 1, due to the rod running to the open air through the top of the

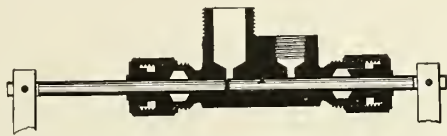


FIG. 4. PISTONS AFTER CHARGE IS EXPELLED.



FIG. 5. PISTONS AT THE INTAKE BEFORE TAKING IN CHARGE.



FIG. 6. PISTONS AT DISCHARGE PORT WITH CHARGE.

lubricant reservoir, and this difference puts the lubricant in the top of the reservoir under slightly more than boiler pressure and would force it into the engine cylinder without any pumping mechanism. The pistons alternately permit and check this flow and the quantity of lubricant allowed to enter the cylinder at each stroke is accurately and easily regulated by the adjusting screw on the rear frame, which regulates the distance between the pistons when taking in a charge.

As the equalized pressure makes the only duty of the pump that of overcoming the friction of its own working parts and the friction between the lubricant and the pipes, its period of usefulness is greatly lengthened and the possibility of wear or breakage reduced to a minimum. In the multiple-feed pumps, each feed is regulated separately and independently and on all pumps there is positive indication of the quantity of lubricant fed at each charge, of the quantity fed in any given interval of time, and of the amount in the reservoir.

The apparatus before being placed upon the market was put in actual service, under the heaviest duty, in several power plants for a period of two years, and both the mechanical and economical results were highly satisfactory. In every instance graphite was used, and the chief engineers reported a great advantage in quality and saving in cost of lubrication over that obtained by using oil alone. The saving varied from 25 to 50 per cent. in actual cost of lubrication, the variations being occasioned by the difference in the percentages of graphite and oil used. The device is manufactured by the Milwaukee Metal Working Co., of Milwaukee, Wis.—*The Engineer*.

THE VALUE OF A GOOD, SOFT LEAD PENCIL.

Mr. F. P. Rowe, principal of the Clark School, Mobile, Ala., writes us as follows:

"Samples of your lead pencils received. They are surely an excellent lot—the softer one making shades almost equalling the original cut.

"I had a special lecture this A. M., the subject being, 'The history of a Lead Pencil.'

"One of my boys said his father would sell no other pencil in his store, 'The Mobile Stationery Co.' The value of a good soft pencil was impressed upon their minds.

"I have loaned the pencils to my Drawing Class for experiment as to their preference."

GOOD WORD FOR PIPE JOINT COMPOUND.

The chief engineer of a well-known Western mining company writes us:—

"Our pipe line 2200 feet long, 750 feet head of water (well casing screwed), air and gas lines all over and not one leak, speaks well for Dixon's Graphite Pipe Joint Compound."

POT LEADING LEAD BEARINGS.

Lead linings of bearings will last much longer if they are "pot leaded" with Dixon's Flake Graphite. That is, if their surfaces are thoroughly rubbed with graphite so that the microscopical irregularities are filled with the smooth, tough and enduring graphite.

BURNED BY EXPLODING STOVE POLISH.

Was Pouring Mixture On Stove When Can Exploded.—Neighbors Put Out Flames.

The following comes to us from a local paper:

Annie Tryanaske, sixteen years old, is in the Newark City Hospital suffering from serious burns caused by the explosion of a can of stove polish. The girl had started to polish the stove and poured a little of the liquid polish on it. It ignited, setting fire to the remainder of the can, which she held in her hand. An explosion followed, and the burning fluid was scattered over her clothes and around the room.

Some of the other tenants of the house heard her scream and quickly put the blaze out by wrapping her in blankets. The fire in the room was quickly beaten out. The girl's right arm was burned as far as the shoulder, and her neck and breast were severely burned.

OUR LONDON PAGE

All Communications, Inquiries, Etc., relating to this Page should be addressed to Joseph Dixon Crucible Co. (Geo. W. Wollaston, Mgr.), 26 Victoria St., S. W., London.

IN THE MATTER OF PRICE.

"Your graphite is very good, but the price is much too high."

So read a "short and sweet" note received the other day from a firm to whom we had sent sample and quotations. This particular firm manufactures phonograph records.

Now, it happens that the previous day we were talking to another firm in the same line of business, who also had tried our graphite and then ordered a stock for regular use. They stated that if our graphite was double or treble the price they would still buy it. The quantity of graphite necessary on a record is infinitesimal. But note the result of using inferior material, such as this firm previously had.

Suppose they pay a noted artiste a whole heap of money for a song, and then, owing to bad graphite, the record is defective and, for all practical purposes, useless? This has happened time and again.

So it is with machinery.

The use of graphite is, in the first place, a high economy; it reduces the oil bill, prevents trouble with hot bearings, and improves the lubrication all round. The use of Dixon's Pure Flake Graphite means a saving of 50 per cent. Yet when, in the natural course, imitations spring up at less money, some false economists "go for them" and subject their expensive and delicate machinery to unknown perils in the shape of grit and other deleterious substances due to an imperfect state of purification.

When the lubrication—such as for cylinders of blowing engines, &c.—does not call for the highest, purest form of graphite, we can supply cheaper qualities at competitive prices. But you take it from us that for general machinery there is no graphite equal in purity and lubricating qualities to Dixon's Ticonderoga Pure Flake Graphite, and none so economical all round.

It's not the initial expense, but the results that tell.

TO OUR AGENTS.

We have started this page in the hope of furnishing useful and interesting items respecting our graphite products as in use here. We solicit your kind co-operation, and shall be pleased at all times to hear from you.

Dixon goods are good, solid goods that stand the test of time. We have customers on our books now that were customers when we first started here. They were not easy to secure then, but graphite is better known now and well established. It is well worth exerting yourselves a little with. We wish you every success.

RESOURCEFULNESS.

An enterprising Yankee came over to England and decided to open a stationer's shop in Newcastle-on-Tyne. He obtained premises next door to a man who also kept a shop

of the same description, but was not very pushing in his business methods, preferring to jog along in the old conservative way. The methods of the Yankee, however, caused the old trader to wake up, and, with the spirit of originality strong upon him, he affixed a notice over his shop with the words, "Established fifty years," painted in large letters. Next day the Yankee replied to this with a notice over his shop to the following effect: "Established yesterday. No old stock."—*British and Colonial Printer and Stationer.*

OUR LATEST AUTOMOBILE AD.

SAVE THE CAR

By using Dixon's Graphite Lubricants, which are the result of long experience, many experiments, and the co-operation of leading motor car manufacturers.

Booklet Free.
JOSEPH DIXON CRUCIBLE CO.
26, Victoria Street, London, S. W.

GET SPEED

A TRYING PAINT TRIAL.

Recently we were invited by an engineer in charge of some large works in Kent to inspect some material upon which our paint was applied in August, 1902. The material consisted of a lot of structural steel submerged in a river, into which the waste water from a number of paper mills and chemical works drains.

The paint has been subjected to the action of this water highly charged with acids and chemicals.

The engineer states that he previously never had any paint last longer than two months on this job. But Dixon's Silica-Graphite Paint was found to be in practically the same condition as when applied—eighteen months previously.

STRIKING FIGURES.

Now read the following:

COST OF LABOR:

Red Oxide..... 7 4 per 100 yards super.

Dixon's Graphite Paint... 5 10 " " "

COVERING CAPACITY:

Red Oxide..... 100 yards super. took 33½ lbs.

Dixon's Graphite Paint... " " " 12 lbs.

These are very striking figures. They give the result to tests made on some important work in London to determine the relative costs as between red oxide and Dixon's Silica-Graphite Paint. We invite everybody to send for further particulars.



MAIN BUILDING, A. B. SEE ELEVATOR PLANT, JERSEY CITY.

Jersey City's unrivaled shipping facilities by trunk lines and water routes, has attracted many manufacturing concerns from New York and Brooklyn, and the new plant of the A. B. See Elevator Company on Pacific Ave., Jersey City, will replace this concern's Brooklyn plant.

The ground area allows future extensions to the buildings now being completed, consisting of the main building, 460 by 250 feet, with a testing tower 85 feet high, with a 15 ton overhead crane running the entire length of the building. A switch of the Central Railroad of New Jersey runs through the main shop, and over a coal vault at its end. The powerhouse is 35 by 75 feet, with a brick smoke-stack 125 feet high. The loading shed is 135 by 35 feet, and the cold storage building 75 by 30 ft. Electric power is used throughout.

The plant as it stands costs over \$200,000, and was designed by a prominent architect of Jersey City, Mr. John T. Rowland, Jr. The buildings were erected by Wm. L. Crowe, general contractor, No 287 Fourth Ave., New York City. The structural steel work was supplied by the Hay Foundry & Iron Works, Newark N. J.

Dixon's Silica-Graphite Paint, Natural Color, was selected and used for the priming coat, and Dixon's Olive Green for the finishing coat, in protecting the structural steel work of all the buildings.

The appearance and protective qualities of this paint proved highly satisfactory to the owners, architect and builders.

ROOF PAINTING.

A prominent manufacturer of Boston, Mass., sends us this unsolicited endorsement of Dixon's Silica-Graphite Paint, for tin roof protection.

"The graphite paint which we had from you five years ago for our tin roof and which was used at that time, was reported by our painter to be "as good as new," and that

a new coating would not be required, but last year we put on another dose. We recommend this to any party wishing paint for roofs."

We have records covering the use of this paint in different climates, and will be glad to give full particulars as to its use.

ACTUAL ECONOMY.

Steel poles, roofs, tanks, bridges, buildings and smoke-stacks, painted at this season of the year with Dixon's Silica-Graphite Paint, will not require repainting for many seasons.

BOILER FRONT PAINT.

The heat-resisting qualities of Dixon's Silica-Graphite Paint, Black, ready mixed for use, are well demonstrated in the following letter from a large tile manufacturing concern in Ohio.

"Twelve years ago we had some of your graphite paint which we used on our boiler fronts. During this time they have been repainted twice with your product, and they are in splended shape. We certainly are very much pleased with the paint. The paint was of a very dark grey, almost black. We have just completed three large new boilers and wish to paint the fronts and breeching with the same paint.

"Will you please let us know the different sized packages you put this paint up in, and also the price. We wish to do this job of painting, and also keep it on hand for touching up from year to year."

We have a very interesting little circular on "Protection of Heated Surfaces," which will be sent upon request.

A GOOD PAINTER AND A GOOD PAINT

are necessary for successfully preventing the destruction of steel and ironwork by rust. We invite correspondence on the subject of preservative paints for all classes of metal construction.

PROMINENT STRUCTURES

**Their Steel Work Painted with Dixon's Silica-
Graphite Paint to Protect Against Rust.**

| | |
|--|---|
| Belmont Hotel, New York City. | Mutual Assurance Building, Richmond, Va. |
| St. Regis Hotel and Apartments, New York City. | Seelbach Hotel, Louisville, Ky. |
| Knickerbocker Hotel, New York City. | Kentucky and Indiana R. R. Bridge, Louisville, Ky. |
| Broadway Tabernacle, New York City. | Germania Bank Building, Savannah, Ga. |
| Algonquin Hotel, New York City. | Alma Cement Co. Plant, Wellston, O. |
| Marie Antoinette Hotel, New York City. | Northern Boulevard Viaduct, Albany, N. Y. |
| Hotel Astor, New York City. | Midland Portland Cement Plant, Bedford, Ind. |
| 71st Regiment Armory, New York City. | Sanitary District Bridges, Chicago, Ill. |
| Broad-Exchange Building, New York City. | National Steel Foundry Co. Building, New Haven, Conn. |
| American-Exchange National Bank, New York City. | City Hall, Newark, N. J. |
| Atlantic Mutual Insurance Building, New York City. | Edison Portland Cement Works, Stewartsville, N. J. |
| Mutual Life Insurance Building, New York City. | Henry R. Worthington Hydraulic Works, Harrison, N. J. |
| Home Insurance Building, New York City. | North German Lloyd Steamship Terminal, Hoboken, N. J. |
| Madison Square Apartments, New York City. | Hamburg-American Steamship Terminal, Hoboken, N. J. |
| French Hospital, New York City. | Babcock and Wilcox Co. Buildings, Bayonne, N. J. |
| Kuhn, Loeb Building, New York City. | Public Service Mile Elevated Structure, Hoboken, N. J. |
| No. 98 William Street Building, New York City. | A. B. See Elevator Plant, Jersey City, N. J. |
| Wylls Building, New York City. | Pennsylvania R. R. Elevated Structure, Jersey City, N. J. |
| Trinity Building, New York City. | Thirteenth Street Viaduct, Jersey City, N. J. |
| Willis Avenue Bridge, New York City. | Mercer Street Viaduct, Jersey City, N. J. |
| Child's Dairy Building, New York City. | Commercial Trust Building, Jersey City, N. J. |
| Aeolian Building, New York City. | Jersey City Library, Jersey City, N. J. |
| Boudoin Building, New York City. | Alaska Building, Seattle, Wash. |
| Standard Building, New York City. | Utah Cons. Mining Co.'s Plant, Salt Lake City, Utah. |
| Harvey Fisk and Sons' Building, New York City. | Hotel Jefferson, St. Louis, Mo. |
| 61st Street and Madison Avenue Apartment, New York City. | Cuban Jai Alai Building, St. Louis, Mo. |
| Touaine Hotel, Brooklyn, N. Y. | Old South Building, Boston, Mass. |
| Standish Arms Hotel, Brooklyn, N. Y. | South Terminal, Boston, Mass. |
| St. George Hotel Addition, Brooklyn, N. Y. | Ticonic Suspension Bridge, Waterville, Me. |
| Williamsburg Trust Building, Brooklyn, N. Y. | Bellefield Dwellings, Pittsburg, Pa. |
| New York Dock Company's Warehouses, Brooklyn, N. Y. | Union Railroad Bridge, Pittsburg, Pa. |
| Hotel Lafayette, Buffalo, N. Y. | Wabash Station and Trainshed, Pittsburgh, Pa. |
| Bailey, Banks & Biddle Building, Philadelphia, Pa. | Merchant's Exchange Building, San Francisco, Cal. |
| Pennsylvania Building, Philadelphia, Pa. | Wells, Fargo Express Building, San Francisco, Cal. |
| Keith's Theatre, Philadelphia, Pa. | Mutual Savings Bank, San Francisco, Cal. |
| Girard Estate Building, Philadelphia, Pa. | Upham Building, San Francisco, Cal. |
| Wilmington Malleable Iron Works, Wilmington, Del. | Hayward Office Building, San Francisco, Cal. |
| Belvedere Hotel, Baltimore, Md. | Loan and Exchange Building, Columbia, S. C. |
| | U. S. Naval Buildings, Annapolis, Md. |

**JOSEPH DIXON CRUCIBLE COMPANY,
JERSEY CITY, N. J.**

Graphite

VOL. VI.

JULY, 1904.

No. 8.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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"POT-LEADING."

Methods of Applying Graphite to the Bottoms of Boats.

In answer to your correspondent's inquiry as to the best method for pot-leading a racer, I would say that in this case, as in very many others, every sailor has his own ideas on the subject and follows his own methods. From time to time, authorities have laid down the rules and methods for applying a smooth coating of graphite to the outside of boat's hulls, and in general they are either one of two ways.

The first consists in mixing the desired amount of pot-lead with enough very thin shellac to give it a thin consistency. This is applied in a thin coating with a soft brush and rubbed with a cloth after it dries. Some times dry graphite is dusted over the varnished coat before it is thoroughly dry. If this

doesn't give an absolutely smooth surface, very fine sand-paper may be used to remove all irregularities.

The second method followed is to varnish the outside of the hull with a thin coating of shellac cut in alcohol, so as to give a slightly "tacky" surface, on which graphite is dusted through a thin cloth bag, or something similar, before the shellac is dried. This is then rubbed down with a rag or polished with a brush. In these two methods small areas may be treated at a time, so that the different coatings of shellac do not have a chance to dry before the graphite is dusted on, or else the varnishing may be done by one man and the dusting by another following him.

A well-known experienced chemist wrote to the Dixon Company as follows: "I think that a good effect will be obtained over the ground coat of Dixon's Silica Graphite Paint by giving the graphite paint when dried a quick brushing over with benzine and immediately dusting with graphite or pot-lead. Benzine evaporates very quickly, and the surface would be almost immediately ready for the polishing-brush. Benzine acts by softening the oil of the paint, thus causing the graphite to adhere, and had best be applied with a soft brush and as quickly as possible, so as to affect only the surface of the paint." Dixon's Silica Graphite Paint is itself very largely composed of pure flake graphite, and if this is used, as it may very well be, on the under body of yachts and launches it will provide

a permanent coating of graphite that is very durable, and may be occasionally rubbed up with pot-lead, and remarkable smoothness is imparted to the under body.

A prominent Western engineer, who is also a motor-boat enthusiast, recently ordered a gallon of Dixon's Silica Graphite Paint, natural color, and some pot-lead for his motor boat. We quote the following from his letter: "As my boat is built upon speed lines, and will be as nice as a parlor, I will make friends for you from St Paul to St. Louis, and when I beat a fellow launchman I will tell him, 'pot lead did it.'"—*The Rudder*.

JOY IN KANSAS.

Engines and Pumps Work Easily on One-Quarter Former Quantity of Oil.

We have the following from Mr. R. C. Havenhill, engineer of lighting plant, City of Chanute, Kansas:

"We buy Dixon's No. 1 Flake Graphite—five pounds at a clip. I use it on my engine cylinders, occasionally putting it through the oil-pump. I believe I get more enjoyment out of its use on the boiler feed-pumps than anywhere else. By using a small amount of flake graphite, twice a night, the pumps work easily and run on about one-quarter the oil otherwise required. I also use a sprinkling of the flake graphite in my grease for governor bearings, and find that it increases the regulation of the engine."

LUBRICANT FOR ROPES.

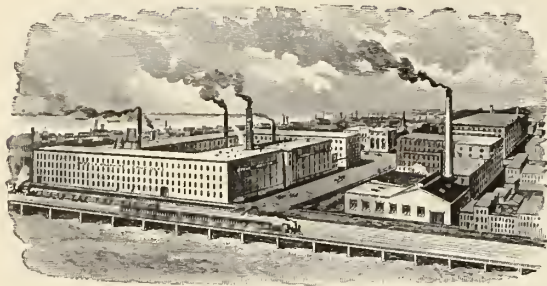
As a lubricant for Manila ropes, oil should not be employed, says the *American Machinist*. Flake graphite should prove satisfactory, but it ought to be applied in the spinning process. Cotton ropes ought to be very sparingly dressed with some composition, just sufficient being used to prevent fluffing. A much-used mixture is graphite and molasses or treacle, very little being applied at any one time. If an oiled rope becomes sodden and soppy, it may be remedied by repeated applications of powdered chalk to absorb the oil.—*Canadian Trade Review*.

It is hardly worth while to experiment with unknown belt dressings when Dixon's Traction Belt Dressing comes recommended by a record of twenty-seven years of good work in preserving leather belting. It accomplishes just that cushioning and softening of the fibre of leather that experts call "life."

A WOMAN generally gains her point except when she tries to sharpen a pencil.—*Philadelphia Record*.

ESTABLISHED 1827.

INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

BRANCHES AT

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Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen,
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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. V.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., July 1904.

OUR LONDON PAGE.

We started out in our June number with "Our London Page." If it should peter out or lessen in quantity and quality, the explanation may be found in the following which comes from the London branch: "When copy doesn't arrive, it will indicate that there is barrenness in the land and in the office."

"A HANDY PACKAGE FOR A TOOL-BAG."

This is what the Joseph Dixon Crucible Company styles a collapsible tube of Dixon's Graphite Pipe Joint Compound. This form is particularly useful for all small work away from the shop, or for those who have only occasional need for making threaded connections. This new package admirably fulfills every requirement for all work upon small fittings and, in general, wherever large quantities of pipe-joint compound are not needed. Indispensable to the kit of every machinist, engineer, plumber, steam-fitter, gas-fitter, automobilist, etc. Each tube is packed in a strong cardboard box. Cases of 36 and upward. Order by Trade No. 628.—*Mining World*.

PROGRESS.

The secret of human progress lies in novelty. We cannot progress if we eternally keep at the same tasks. Prosperity means continued ambition, endeavor, zeal and progress.—From Commercial Leadership, in *Political Economy*, March, 1904.

GRAPHITE AND SHELLAC FOR WOOD PATTERNS.

A manufacturing firm in the West use Dixon's Electro-typer's Graphite No. 649 with shellac to make a durable varnish for their wood patterns. Lampblack was formerly used, but graphite stands the hot sand far better.

GRAPHITE SHOWS ITS MERITS.

Mr. W. B. Cannon, engineer at the Kansas City Gas Works, Kansas City, Mo., writes us: Here is a case where Dixon's Flake Graphite showed its merits: The crank-pin of the coal-gas-scrubber engine seized during the night. It is impossible to take any light in the scrubber-room, except a safety-lamp. The engine was left till morning. As the engine is never shut down, except for repairs, I thought of Dixon's Flake Graphite. I loosened up the crank-pin box, put some graphite in and started the engine. The box ran warm the first day, but after that gave no more trouble.

WAR AND THE COST OF WAR.

A million dollar-bills packed solidly like leaves in a book make a pile 275 feet high. One thousand million dollars, the price which Europe annually pays for armaments in time of peace, equal a pile of dollar bills over 52 miles high. This expenditure for the supposed prevention of war represents one thousand million days' labor at one dollar per day. This, be it remembered, every year to enable each nation merely to hold its own.

A second pile of dollar-bills over 52 miles high represents the annual payment for interest and other costs of past wars.

To these inconceivably large amounts must be added the earnings of the millions of able-bodied men in army and navy who are withdrawn from productive industries and are supported by taxed peoples.—*Geyer's Stationer*.

DIXON'S GRAPHITE BRUSHES.

"Dixon's Graphite Brushes are entirely satisfactory" is about the wording of all the reports we are getting from those who have used the Dixon brushes. They are said to wear commutators less and to be superior in many ways to the brushes generally used.

GRAPHITE IN THE AUTOMOBILE.

According to the *Automobile Review*, the transmission gear of the Duryea automobile is of the planetary variety. The slow speed clutch is a friction band 12 inches in diameter by 1 inch face, while the high clutch is a double cone 10 inches in diameter with 2½ inch faces, the inner ones being of brass and the surfaces permanently lubricated by graphite plugs. All bearings in this transmission gear are similarly lubricated so that oil is not needed and is detrimental.

REMOVING GRAPHITE FROM EXHAUST.

QUESTION.—Please inform me of some device that will remove graphite from exhaust steam.

ANSWER.—We know of nothing better than a separator in which a number of baffles change the course of the steam abruptly. Separators of this description will be found on the market.—*The Engineer*.

PACKING PUMPS.

By W. H. WAKEMAN.

A pump is one of the most simple contrivances to be found in a steam plant, yet it is hardly possible to find an engineer who has never had trouble with one or more of them. If a man claims that he has never found one that refused to work properly, it is proof that he has not had much experience as an engineer. This assertion may cause some of our friends who are now in charge of steam plants to take exceptions to our view of the case, but we may be right after all.

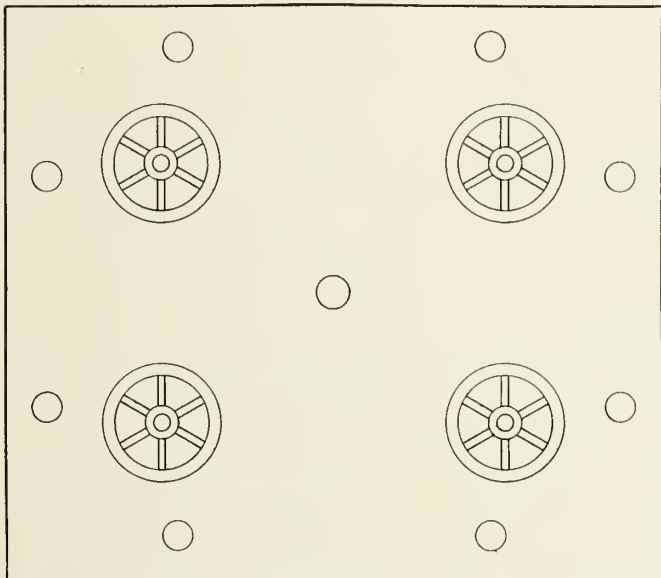


FIG. 1

Several years ago the writer had a pump that was fitted with soft rubber valves for cold water only. The water ports were fitted with guards in the usual way as illustrated in Fig. 1. One day this pump commenced to give trouble by travelling faster on one stroke than the other.

Of course everybody knows that a pump does not travel around the country, and this is not meant when we speak or write about a "pump travelling," as we only mean to convey the idea that the piston and valve travel back and forth.

When one stroke is made more rapidly than the other, it indicates that one water valve is out of order, and an examination of it proved that this was the case, for the pressure acting on the top of the soft rubber valves had forced a piece of one of them down through the space between the guards illustrated in Fig. 1, hence no water was delivered during one stroke. The fragment of a valve was in the shape of a piece of pie, and was cut almost as clearly as that delight of the small boy usually is.

In another case all valves on a duplex pump were out of order, hence all four of the strokes were about alike, and all were useless. The ordinary direct acting pump is designed as shown in Fig. 2, with the delivery valves above the suction valves, the two sets being separated by a cast iron plate which forms the seats of the former. From this it will be plain that in order to examine the lower and upper valves it is necessary to break two packed joints. I well remember the time when it was necessary to replace all

valves on a certain duplex pump already mentioned, for the packing held so firmly that a heavy hammer had to be used vigorously on a cold chisel in order to loosen it, and there was great danger of breaking this plate while driving in the chisel.

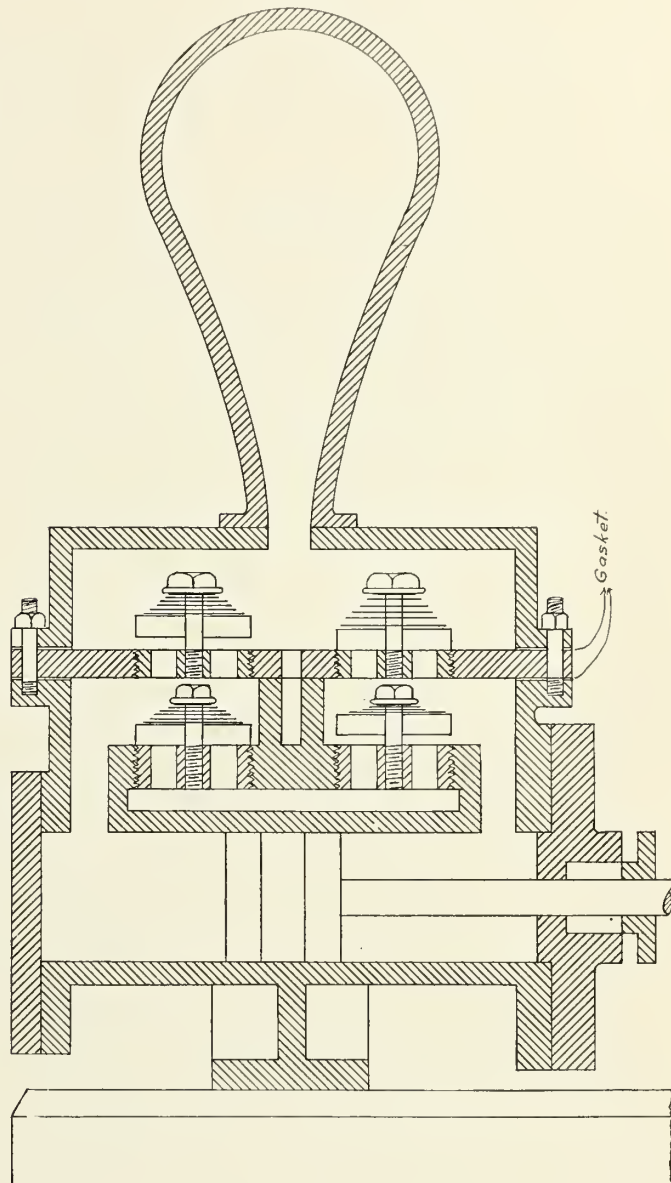


FIG. 2

Fortunately the packing "let go" before the plate broke, and the valves were made tight. It was next in order to clean packing off from four surfaces, so as to insure tight joints when new packing was put on. After this, two gaskets were cut out of sheet packing, and by referring again to Fig. 1 it will be seen that these are of irregular shape, and furthermore at some points not shown in the illustration, only a narrow strip of packing can be used, all of which helped to make a disagreeable job, for it must be remembered that a pump does not break down when standing idle, or in other words when there is plenty of time to fix it, but just when it is wanted badly, and as this one was used for pumping hot water it proved still more disagreeable, as the parts were not cool.

It is all right to have packing hold firmly, but if it adheres to one part of the flanges or plates to be packed it is just as good, (so far as practical service is concerned,) as if it stuck to both surfaces, and there is an important point in favor of the one surface theory, as the joint can be broken much more easily.

When this pump was repacked I took care to have the lower surface of the gaskets perfectly clean, but the upper surface of each was carefully covered with enough good cylinder oil, (I never use any other kind,) to make a thick paste.

When some engineers attempt to cover a gasket in this way, they succeed in touching nearly all of the surface, but leave a spot here and there. The packing is sure to stick at these points and when the joint must be broken again the gasket is ruined, the engineer loses his temper, and the whole plan of using a gasket more than once is condemned as impractical.

The only point that this proves is that if a job of any kind is worth doing at all it is worth doing well. More than one man holds a good position on account of doing his work thoroughly, when others of larger mental caliber, but of less careful disposition, are not wanted. The above remarks may seem to be a little "off the track," to some reader, but they are worthy of attention nevertheless.

The gaskets were replaced, the pump started and although those joints have been taken apart many times since, the same gaskets are still in use and are good for several years more. Now there is no trouble in taking the water end apart, for the packing does not stick on one side and, so far as practical service is concerned, I have a set of ground joints. When all things are considered they are superior to ground joints because there is less danger of causing them to leak, and when worn out they can be replaced much cheaper than the surfaces could be scraped and filed to a perfect metallic fit.

As already stated, these gaskets have been used many times, but the exact number is not on record. It is perfectly safe to say that the use of graphite has saved \$15.00 in this case alone, and a considerable saving of labor has also been effected.

Packing used on the cylinder heads of all pumps are treated alike with equal success and satisfaction.

The packing used on the piston rods of these pumps is thoroughly coated with graphite (Dixon's, of course,) and although some of it has a coating of this material when it comes from the store, it is always given another. This reduces friction on the rods, and makes it easier to take out the old rings when new ones are wanted.

Braided flax forms a very good packing, but it is improved by a good coat of graphite and oil well rubbed in, as it lubricates well and keeps the packing soft longer than it would be otherwise. Alternate rings of flax and canvas with rubber insertion forms an excellent combination.

If a hot water pump is fitted with complete metallic water pistons it will do good service, provided the water is perfectly clean, but much of the water coming from our heating systems contains grit and dirt that will destroy a brass piston, yet it is comparatively harmless to a piston packed with fibrous packing.

MAN'S FAITHFUL FRIEND.

Some years ago, says the *Nashville American*, Senator Vest, of Missouri, attended court in a country town, and while waiting for the trial of a case in which he was interested, was asked by the attorney of a dog case to help him. Evidence was shown that the defendant had shot the dog in malice, while other evidence was introduced to show that the dog attacked the defendant. Senator Vest took no part in the trial, but upon being urged to speak, carefully scanned the faces of each jurymen for a moment, and paid this eloquent tribute to our noble friend:

"Gentlemen of the jury: The best friend a man has in the world may turn against him and become his enemy. His son or daughter that he has reared with loving care may prove ungrateful. Those who are nearest and dearest to us, those whom we trust with our happiness and our good name, may become traitors to their faith. The money that a man has he may lose. It flies away from him, perhaps when he needs it most. A man's reputation may be sacrificed in a moment of ill-considered action. The people who are prone to fall on their knees to do us honor when success is with us may be the first to throw the stone of malice when failure settles its cloud upon our heads. The one absolutely unselfish friend that a man can have in this selfish world, the one that never deserts him, the one that never proves ungrateful or treacherous, is his dog. A man's dog stands by him in prosperity and in poverty, in health and in sickness. He will sleep on the cold ground, where the wintry winds blow and the snow drives fiercely, if only he may be near his master's side. He will kiss the hand that has no food to offer; he will lick the wounds and sores that come in encounter with the roughness of the world. He guards the sleep of his pauper master as if he were a prince. When all other friends desert, he remains. When riches take wings and reputation falls to pieces, he is as constant in his love as the sun in its journey through the heavens. If fortune drives the master forth an outcast in the world, friendless and homeless, the faithful dog asks no higher privilege than that of accompanying him. to guard against danger, to fight his enemies. And when the last scene of all comes, and death takes the master in its embrace, and his body is laid away in the cold ground, no matter if all other friends pursue their way, there by the graveside will the noble dog be found, his head between his paws, his eyes sad, but open in alert watchfulness, faithful and true even in death."

Then Vest sat down. He had spoken in a low voice, without a gesture. When he finished the judge and jury were wiping their eyes. The jury filed out, but soon entered with a verdict in favor of the plaintiff for \$500; he had sued for \$200.—*Popular Science*.

FORCEFUL RATHER THAN RHETORICAL.

A man given more to force of speech than smoothness and choice of words, heard a conceited young man speak of another of undoubted ability as crazy, and made the following reply: "Young man, if you ever get so much brains, when you ain't crazy, as that man has when he's crazy, you will have a damn sight more sense than you ever get so long as you live."

DIXON'S LUMBER PENCILS.

At the end of most of the logs cut in this country are measurement marks made with Dixon's Lumber Pencils. Dixon's were the first pencils made for this special purpose, and when they came upon the market many years ago they filled a real want among the lumber people for a good marking pencil.

In black alone six varieties are made, suitable for green or dry lumber and the preference of the user for a square or hexagonal crayon. Some are paper covered and some are japanned to protect them from wet. These black crayons, like the Dixon pencil leads, are all made of the finest American graphite.

Seven bright colors are also made—brown, yellow, terra cotta, red, green, blue, and white. The pigments are the very finest obtainable, in most cases imported from the European color makers, and the colors are particularly vivid and permanent. These crayons are thoroughly waterproof and the marks unusually brilliant and strong and not easily rubbed off.

If there are any not familiar with these crayons, or who are interested in general-purpose or special-purpose pencils or crayons, the Joseph Dixon Crucible Co., of Jersey City, N. J., will gladly supply full information and send their catalogues and samples.—*Geyer's Stationer.*

LUBRICATION OF AN AUTOMOBILE.

Little Things That Help to Make the Running of an Automobile a Pleasure and a Success.



Mr. Albert L. Clough recently delivered a lecture before the Young Men's Christian Association Automobile School, taking for his text the good old proverb, "An Ounce of Prevention." Mr. Clough said that a little

care in looking after the working parts of an automobile was well repaid by freedom from troubles, due to a thousand and one causes, each in itself small.

On the subject of "Lubrication" he said: "The chief causes of damage to the mechanism, which may be removed by inspection, are the failure of the lubrication of some parts. Upon the lubrication of each working part of the mechanism depends its wearing power and even its operativeness, and too great care cannot possibly be taken in regard to it. The most important purposes of lubrication are: (1) To prevent overheating, abrasion and cutting. (2) To prevent wear. (3) To lessen the amount of power necessary for a given result.

"The cost of lubrication of an automobile is not a large item, but the liability of wear, due to the rapidly moving and heated parts, and the accumulating dust of the roadways, demand a lubrication that is smooth and comparatively dry—something better than oil or grease alone, and which will not catch and hold dust and dirt as readily as either oil or grease.

"If chains, gears, cams, rollers, valves, pistons, cylinders and a score of the other parts of an automobile that work, metal against metal, can be so lubricated as to greatly lessen the amount of wear and tear, a very great stride will have been made toward better things and the automobile will be assured a much longer and smoother life."

It is almost needless to say that where there is little wear there will be a very much reduced repair account and renewal of worn and broken parts.

Men of unquestioned authority in such matters have proved, by most searching and severe tests, that cutting of metal surfaces is impossible in the presence of pure flake graphite and that the natural wear of friction surfaces is greatly reduced. Therefore it is evident how significant is the well-known claim that Dixon's Pure Flake Graphite, used with wisdom and discretion on the different working parts of an automobile, will greatly lessen this item of depreciation and wear.

A special grade of flake graphite, known by its trade number as 635, is recommended for use on automobiles because of its delicacy, purity and exceeding fineness of pulverization of the flake graphite, which permits it to be introduced either dry or mixed with oil or grease, according to the needs of the several parts upon which it is used.

The Joseph Dixon Crucible Company prepares several graphite compounds especially adapted to the automobilist, such as Graphitoleo, which is a mixture of vaseline and Dixon's No. 635 Graphite. Graphitoleo is particularly desirable for small bearings, slides, and thinned down with oil it is used as a cylinder lubricant.

The Dixon Company also make a line of graphite cup greases of different densities, which are most excellent lubricants whenever cup grease can be used.

Dixon's Graphite Motor Chain Compound is especially recommended for the treatment of chains of automobiles. It greatly lessens wear and prevents the accumulation of dust and dirt.

THE POWER OF USING BOOKS.

[President Arthur T. Hadley of Yale at Clark University.]

Men in every department of practical life—in commerce, in transportation, or in manufactures—have told me that what they really wanted from our colleges was men who had this selective power of using books efficiently. Anything which has been taught our college students as shop-work they generally have to unlearn at the beginning of their professional career. In any mere mechanical facility they find competitors without college training who surpass them in the details of execution. But if they know where to look for facts in books, and how to apply the teachings of those books to novel and difficult cases, their services are valuable from the first, and inestimably valuable as time goes on. The vision of such men is not confined to the single shop or group of shops; they have the whole world before them as a field of study and practice. Their ability is not that of the dexterous operative, who can do his ordinary work to perfection but tends to sink himself into the routine of that work; it is the ability of the industrial leader, equipped for any emergency that may arise.

SMART Hotel Clerk—"Now uncle, be sure and don't blow out the gas."

Rural Looking Guest—"Young man, should I at any time contemplate removing the light from my apartment by the means you suggest, I should expect to blow out the flame, not the gas."—*Pittsburg Post.*

THE SCENES OF CHILDHOOD.

With what anguish of mind I remember my childhood.

Recalled in the light of a knowledge since gained;
The malarious farm, the wet fungus-grown wildwood,
The chills then contracted that since have remained;
The scum-covered duck-pond, the pigsty close by it,
The ditch where the sour-smelling house drainage fell;
The damp, shaded dwelling, the foul barnyard nigh it,
But worse than all else was that terrible well,
And the old oaken bucket, the mould-crust'd bucket,
The moss-covered bucket that hung in the well.

Just think of it! Moss on the vessel that lifted

The water I drank in the days called to mind.
Ere I knew what professors and scientists gifted

In the water of wells by analysis find;
The rotting wood-fibre, the oxide of iron,

The algæ, the frog of unusual size,
The water, impure as the verses of Byron.

Are things which I remember with tears in my eyes.

And to tell the sad truth, though I shudder to think it,

I considered that water uncommonly clear;
And often at noon, when I went there to drink it,

I enjoyed it as much as I now enjoy beer.
How ardent I seized it, with hands that were grimy!

And quick to the mud-covered bottom it fell,
And soon, with its nitrates, and slimy

With matter organic it rose from the well.

Oh! had I but reckoned in time to avoid them—

The dangers that lurked in that pestilent draught,
I'd have tested for organic germs and destroyed them

With potass. permanganate ere I had quaffed;
Or, perchance, I'd have boiled it and afterward strained it

Through filters of charcoal and gravel combined;
Or, after distilling, condensed and regained it

In potable form, with its filth left behind.

How little I knew of the dread typhoid fever

Which lurked in the water I ventured to drink!
But since I've become a devoted believer

In the teachings of science, I shudder to think;
And now, far removed from the scenes I'm describing,

The story of warning to others I tell,
As memory reverts to my youthful imbibing

And I gag at the thought of that horrible well,
And the old oaken bucket, that fungus-grown bucket,

In fact, the slop bucket that hung in the well.

—*London Globe.*

RAILWAY TRAIN DELAY.

Some Interesting Facts as to Cause and Cost of Train Delays and a Means Suggested for Preventing Many of the Delays.

Very much has been said, from time to time, about the direct and also the secondary evils of train delays. Statistics show that more than half of the train delays are due to imperfect lubrication resulting in hot bearings, and of this half 55% are traceable to lubrication troubles on the locomotive. Hot bearings and other troubles always delay the locomotive on the road and, in many cases, send it into the shop for repairs.

A new phase of the situation was presented at a recent meeting of the Rocky Mountain Railway Club, in Denver, at which President Schacks made the following remarks in reference to the cost of hot boxes:

"Not only in waste and oil, but the expense of delay to traffic; the stopping of an engine working at high pressure. Such an engine, being suddenly stopped on account of a hot box, must necessarily blow off, having no use for the steam, and this blowing-off might continue for 15 minutes, perhaps longer, and for every second that an engine, at 200 pounds pressure blows off, there is a waste of $\frac{1}{4}$ pound of coal." He further said that if a box were allowed to run hot, it would cost the company the price of 15 pounds of coal for every minute that an engine blows off, and laid emphasis on the necessity of guarding against such waste.

Owing to the peculiar nature of flake graphite, it is difficult to use it with any advantage in lubricating an ordinary axle journal bearing, although it has long been used, in an emergency, to cure hot pins, eccentric straps, sticking valves, laboring cylinders and squealing air-pumps.

Dixon's Pure Flake Graphite has long since made a record for itself and is relied upon by most of the railroad engineers of this country, not only as a never-failing remedy for trouble in emergencies, but as something which is to be used regularly and which will prevent the arising of any emergency.

DIXON IN JAPAN.

Mr. Robert A. Brown, Dixon's representative in the East, writes:

"Steamers going home are crowded, as there are no Japanese boats running now and many are going to visit the St. Louis Exposition. War did not bother my affairs in Japan and, except seeing troops everywhere, there were no visible signs of anything out of the usual.

"The harbors are all mined. Our steamer was escorted both in and out.

"The first batch of war correspondents were permitted to move the day I left Yokohama, but they won't get very far."

DIXON'S GRAPHITE COMPOUND.

*Joseph Dixon Crucible Company,
Philadelphia, Pa.*

Dear Sirs:—In answer to your letter of the 1st inst. would state that we have been using the Dixon Graphite Pipe Compound in all our steam operations for about three years, and up to this time we have had no complaint whatever, and we consider it a first-class article.

Yours very truly,

BARNES & ERB COMPANY,

Mfrs. Laundry Machinery.

THE *New York Tribune* tells us that it has now been demonstrated that carbon can be dissolved in melted silicates and afterward crystalized. Experiments have been conducted separately by Hasslinger, Ludwig, Luze and Friedlander. In some instances the product was that form of carbon which is known as graphite: in others diamonds, which were exceedingly small, but were genuine, resulted.

HOW HE GOT A STRAIGHT TIP.

A prominent New York broker tells the following story at the expense of a Philadelphian: Some time ago Mr. W. gave a dinner, and at it were several Wall Street operators. W. is always on the lookout for market tips. As a rule he is rather cautious in his habits, but that night he dined a little too freely and awoke the next morning in a rather muddled condition. But he was perfectly clear on one thing.

Somebody had given him a tip to buy corn. Who gave him the information W. could not recall. He knew nothing of corn, or any other grain. But he went ahead and operated in corn with a vengeance, bought 200,000 bushels, and the price began to climb. Then he bought more. The shorts got scared, ran to cover, and on the final jump W. covered and cleaned up \$80,000.

That night he hunted up his guests and tried to find the man who had given him such valuable advice, but in vain. W. was becoming worried. His coachman drove him home, and as he stepped from his carriage his man said:

"Excuse me, sir, but did you order corn? Last night you promised to buy forty bushels. We're clean out, sir."

He gave the fellow a \$1,000 bill, saying: "Buy the corn and keep the change."—*The Philadelphia Public Ledger*.

LEAD PENCIL WILL VALID.

Court Dismisses the Appeal of Alwine Heier Against Sister's Testament.

In an opinion handed down by Judge Ashman, in the Orphans' Court, the appeal of Alwine Heier, who endeavored to break the will of her sister, Henrietta Heier, was dismissed. Alwine alleged that the will, written in lead pencil, which left the entire estate to Emil Cutsche, a friend, was secured by undue influence.

The allegation rested wholly on the fact that the will was written in lead pencil by the beneficiary and was without witnesses. The court held that the will was valid.

—*Philadelphia Bulletin*.

TO PREVENT RUSTING OF MACHINERY.

There are several formulæ for compounds to keep machinery from rusting. Take one ounce of camphor and dissolve it in one pound of melted lard; remove the scum; then mix with the camphor and lard as much fine graphite as will give it an iron color; clean the machinery well and smear with the mixture. After twenty-four hours rub off; then clean with a soft cloth.—*Mining and Scientific Press*.

LUMBAGO CAUSES WARE TO VERSIFY.

Pension Commissioner Ware has fled for the South to take a much-needed rest. Before going he wrote the President a short note in lead-pencil characters as follows:

I take this piece of plumbago

To tell you I have the lumbago;

I shall hie me away

For a week and a day,

For I feel like a very bum Dago.

—*Washington Times*.

TESTIMONIAL.

So, CHICAGO, Dec. 9, 1899.

*Joseph Dixon Crucible Company,
Jersey City, N. J.*

Gentlemen:—Dixon's Pure Flake Lubricating Graphite has given us the very best of satisfaction, and produced the results you claimed for it.

We have had it in use on the air piston rings of our blowing engines which, when lubricated with other brands of graphite, gave us a great deal of trouble and, as we see now, was due entirely to the graphite failing to lubricate properly—the tendency being for it to pile or "cake" up, causing the brass and babbitt rings to run hot and the babbitt to fall out, which soon resulted in badly cut up cylinders.

The use of Dixon's graphite has entirely done away with this trouble and given a perfect lubricating surface to the cylinders, an extremely desirable condition and one that prompts us to say that where a perfect lubricant is required, there is nothing that equals Dixon's Pure Flake Lubricating Graphite.

Very truly,

ILLINOIS STEEL COMPANY,

Per C. J. BARR, Master Mechanic.

GRAPHITE AS AN AID TO CYLINDER LUBRICATION.

EDITOR OF *Engineer's Review*:

Considerable has been said for and against the use of graphite as an aid to cylinder lubrication. In practical experience I have found it to be a great help when used in small quantities.

I am at present in charge of a plant having a Corliss engine, 18x42 inches. There is no separator or drain on the steam-pipe, consequently the engine gets more or less water, as the steam-pipe is unprotected and the boilers are worked hard. As a result of this, water coming over into the engine, it became quite a problem to keep the cylinder and valves lubricated. As good cylinder oil, in liberal quantities, did not suffice, I tried graphite mixed with a little oil, forcing it in with a hand-pump. I found that by using a scant teaspoonful, two or three times a day, the groaning in the cylinder and valves disappeared and the engine ran much smoother than before, and that it also made a saving in the cylinder oil.

I think a great many engineers condemn the use of graphite in cylinders, from the fact that at some time or another they used too much on the packing rings, springs, valves, etc. Graphite is like medicine. A dose is all right, but an overdose is injurious.—M. J. A.

Dixon's Pure Flake Graphite overlays and glazes with a coating of remarkable smoothness and endurance the minute roughness of metal surfaces, thus attacking friction at its origin.

From various causes oil often fails to sufficiently reduce friction and trouble follows fast. 5% to 10% of Dixon's Pure Flake Graphite will enormously increase the duty of any oil or grease to which it is added, glazing every rubbing surface to mirror-like smoothness.

USES OF FLAKE GRAPHITE ON SHIPBOARD.

Lubrication of Thrust Bearings.

By H. E. RAABE, M. E.



Although the merits of graphite as a lubricant have long been recognized by many engineers, its progress into the engine rooms of steamships has been comparatively slow. The reason for this, however, is not the want of progressiveness among marine engineers, as it may appear to those who have used this most-excellent lubricant extensively in station-

ary plants, but usually an unwillingness to take any risks whatever, or to try experiments. The stationary engineer has not had to be so cautious and, knowing that he had more opportunities for repair in case a bearing should run hot and melt out, he was not afraid to take slight risks and to experiment. After a short trial he would always find that instead of running any risk, he was doing away with all risk.

A hot bearing on board a steamer, however, is a different proposition than in a stationary plant, especially if it should occur during a gale under a lee shore, and for this reason most marine engineers preferred to wait until graphite lubrication passed the experimental stage before testing its value. By the term "experimental stage" it must not be understood that the quality of the graphite had to be improved, but that the best method of using it must be inquired into, and this could only be done by making actual experiments to prove the success not theoretically, but by actual facts.

The purpose of this article is to give the writer's experience with this lubricant on shipboard, so that marine engineers may benefit by it, without feeling any uneasiness about the results.

Every marine engineer knows what a bothersome part of the machinery the thrustbearing is, and good suggestions for keeping it cool are sure to be always welcome.

The first attempt the writer made to use graphite on a thrustbearing, was on a small high-pressure tugboat in East India some twenty-five years ago. The horseshoes as well as the collars were so badly cut from overheating, that it appeared to be a job for the repair shop. This was out of the question, however, as the boat had to remain in service. Having made some experiments with graphite lubrication before, the writer thought that a trial would make the condition of the bearing no worse and set his thinking powers to work, to find the best method of applying it. The first thought was to fill all the cuts in the collars as well as in the horseshoes with graphite. This was done by softening ordinary washing soap, mixing it with flake graphite to form a heavy black paste, which was thickly applied all over the surface of the bearing. Oil was then fed to the bearing moderately and at short intervals a mixture of soap and flake graphite was applied freely. After about an hour's run, the oil supply was stopped entirely, while the graphite application was continued and, to everybody's sur-

prise, the bearing kept perfectly cool throughout the entire run of about eight hours. That evening the bearing was again taken apart and the change that had taken place in it was marvellous. The cuts, instead of being ragged, and the surface of both collars and horseshoes, instead of having a dull appearance which the constant application of the salt water hose had caused, had assumed a perfect polish. It was decided then not to make any attempt to dress the bearing, but to repeat the application of graphite and soap, and to continue the same treatment during the next day's run. After about a week, the wearing surfaces of this bearing had acquired such a polish that it was decided to discontinue the direct application of soap and graphite and to depend entirely upon the amount of graphite that could be fed through the oil holes, the graphite still being mixed with soapy water, and applied to the bearing at regular half hour intervals. Of course, the oil lubrication was continued regularly.

Under these conditions the bearing behaved perfectly, the grooves caused by cutting had shaped themselves into a perfectly smooth-edged circle and all the extra deep cuts had been filled up with graphite, leaving a hard, smooth polished bearing surface.

Before going into further details, it may be well to say something about the especial idea of using soap with the graphite. When mixed with oil, graphite cannot be readily compressed into a solid mass, so as to permanently fill bad cuts and pits in bearings, as neither the graphite nor the oil is of an adhesive nature. On the contrary, both are very slippery, while the soap, mixed with the graphite, will form a cake which, when compressed, becomes quite hard and fills up all the uneven spaces in a bearing.

This experiment induced the writer to try another of the same nature with the thrustbearing. The brass liners from the horseshoes of a thrustbearing were removed, and similar ones made of Babbitt. These were well perforated with half inch holes, and the holes filled with a composition of graphite and soap, prepared in the following manner. The soap was first dissolved in sufficient water to form a liquid of about the consistency of cylinder oil; to this a sufficient quantity of flake graphite was added to form a paste about as plastic as red lead putty. The peculiar part of such a composition is that it will not crumble and fall apart, as the graphite would if mixed with oil, but it has a pasty nature which will firmly fill a cavity and remain there. The process of filling the holes with this paste was not quite such an easy task, but a good deal of pounding with a wooden set and mallet finally filled the holes compactly, so as to form a smooth, hard surface. The horseshoes were put back into their plates, and when the engine was started oil was fed very freely, accompanied by an occasional dose of graphite and soap water. This bearing never showed any tendency to heat, so the oil lubrication was finally discontinued entirely and a cheap grade of grease substituted, mixed with a small quantity of graphite and applied about four to five times during the day.

As a result of this successful experiment the Babbitt and graphite liners were left in place of the former brass liners, and, if the writer had had opportunity, a few more steamers at that station would have been fitted out that way.

The accompanying sketch, Figure 1, is an illustration of one of those thrustblocks.

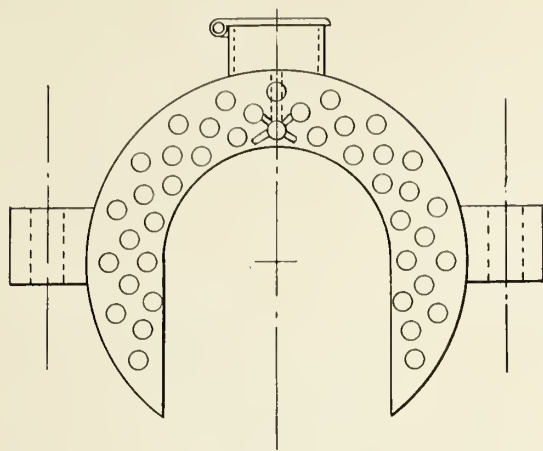


FIGURE 1.

Care should be taken not to drill too many holes in the liner, as the heavy pressure may crush it.

The thrust bearing is one of the hardest, if not the hardest bearing to lubricate, no matter what kind of a lubricant may be used. The principal reason for this will be understood by examining the diagrams, Figures 2, 3 and 4. In

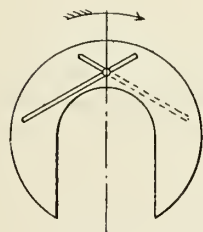


FIGURE 2.

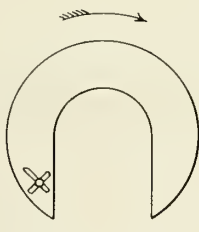


FIGURE 3.

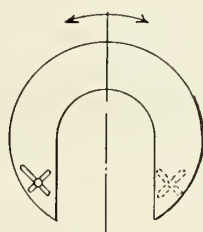


FIGURE 4.

Figure 2 the lubricant is introduced at the top, as near to the shaft as possible, but if the shaft is revolving in the direction of the arrow, it will plainly be seen that one half of the bearing surface is kept almost free from lubrication. In Figure 3 the oil is introduced so that it will have to traverse the whole surface, if the engine is running in one direction, and in Figure 4 the same is accomplished for the reverse motion as well.

In many cases the oil is introduced near both of the lower extremities, as in Figure 4, but although this is an improvement over the design of Figure 2, it still is not wholly satisfactory. Even with the modern thrustbearings, which are practically running in oil, a great deal of trouble is experienced, because the centrifugal force will not permit the oil to flow toward the center of the bearing.

Such difficulties can easily be overcome by the use of graphite, which can be introduced in the shape of a compound, made up of one part machinery oil, one part tallow and one-half part of flake graphite by measurement.

The tallow should be heated sufficiently to be easily mixed with the oil, and the graphite should then be added, and the whole mixture well stirred until cool. The best way to introduce this compound is illustrated in Figure 5.

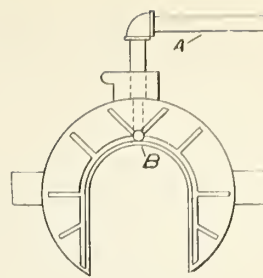


FIGURE 5.

The oil pipe (A) is connected to an ordinary compression grease cup and terminates in the aperture (B), Figure 5, and from this opening a groove is led around the shaft as near to the latter as possible. The opening has several branches radiating outward, as shown in the cut. It is needless to mention that the graphite compound therefore reaches every part of the bearing, and by keeping sufficient pressure in the compression cup, the lubrication is perfectly automatic.

The writer has applied this system to a 9 inch shaft, fitted with five thrust collars and has never had a word of complaint about the heating of this bearing.

The cost of this graphite lubricating compound is very low and every engineer can easily make it up in a very few minutes.

A ten pound can of Dixon's Pure Flake Graphite will last a long time and the lubricant can be used over again several times. Finally, after this compound has been used in the thrust bearing again and again, it will prove to be an excellent lubricant to use on the stern bearing where the shaft leaves the vessel. (A very successful method of lubricating this often-neglected part has been made the subject of another paper.)

The grooves in the horseshoes of the thrust bearing should be from $\frac{5}{16}$ to $\frac{1}{2}$ inch wide, according to the size of the bearing; the branch grooves need not be more than from $\frac{3}{16}$ to $\frac{5}{16}$ inch wide, and all of them should be of a depth equal to two-thirds of their width.

If the bearing has been so designed that the lower portion of the thrust-collars on the shaft dip into oil, such an arrangement need not be disturbed, as it does not interfere with the method of applying graphite, which I have described.

The proportions of the graphite compound given above apply only if a light grade of machinery oil is used to thin the grease. If a heavier grade of oil is used, more of it will be needed to keep the mixture thin enough to flow through the feed pipe.

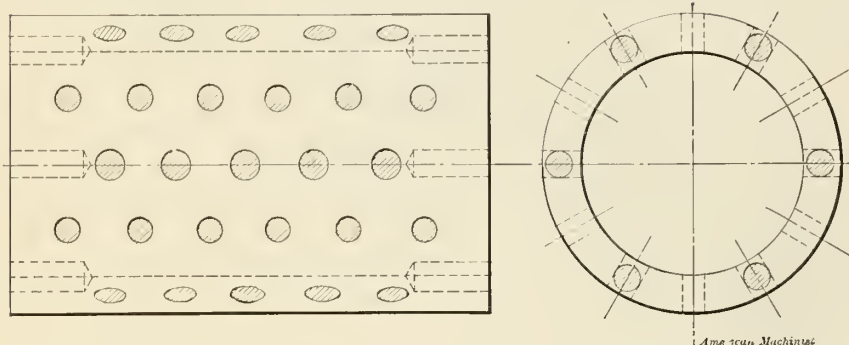
Ball thrust bearings are often used in small boats, particularly in gasoline launches and the so-called "motor boats," and the makers often call them "oilless bearings," this term being generally understood to mean that the bearing requires no lubricant. With such bearings the writer has made some tests, running them perfectly dry and also with a small quantity of the flake graphite compound, as above described, with results very much in favor of the graphite lubrication. The benefits are (1) cooler running bearings and (2) much less wear. It is well known that Dixon's Flake Graphite very largely reduces wear.

BUSHINGS FOR HIGH-SPEED LOOSE PULLEYS.

By courtesy of the *American Machinist* we publish the following, which answers fully a number of inquiries received on this same subject:

Editor *American Machinist*:

To those who have had trouble with high-speed, loose pulleys, wearing out in the bore, I would recommend the scheme shown in the accompanying sketch. A brass, or preferably a phosphor bronze bushing, turned a driving fit in the pulley hub, is first drilled with 3-16 or $\frac{1}{4}$ -inch holes,



staggered as shown, and the holes are then forced full of Dixon's No. 690 Graphite Compound. A small oil-hole should also be provided, as it is best to occasionally use a small quantity of oil which, with the compound, makes a paste which lubricates nicely, even though the shaft be slightly cut or uneven. Should the pulley heat, the mixture softens and lubricates without attention.

Bushings made as described and used on an emery wheel counter shaft, have run for more than a year with little wear, whereas those made of cast iron, brass and phosphor bronze, without the compound, had quickly failed.

The compound comes in sticks wrapped in foil. It is inexpensive, and the trouble avoided will certainly pay for the cost of the job.—H. E. B.

THE Joseph Dixon Crucible Company, Jersey City, N. J., is distributing an attractive booklet entitled "Dixon's Graphite Suggestions." The cover page of this booklet is embellished with a drawing in colors of several ancients marking on the wall with graphite. This attractive little booklet sets forth the advantages and indefinite diversity of graphite, giving a short history of the Joseph Dixon Crucible Company and its connection with American graphite, graphite pencils, crucibles, in the foundry, for lubrication, graphite for bicycles and automobiles, for power launches, pot-lead for yacht bottoms, for electricians' or domestic use, belt dressing, graphite paint, and as a pipe-joint compound.—*Electrical Review*.

SUPERHEATED steam means fuel economy of 10% to 25%. The use of superheated steam is largely limited by the lack of suitable cylinder oils to stand the higher temperatures.

Dixon's Pure Flake Graphite, unaffected as it is by any degree of heat, is of the greatest help to oils in solving this difficult problem in lubrication, economical in itself, and making great plant economies readily attainable.

TO PUBLIC SPEAKERS.

Dixon's Graphite used in the correct proportion, say one cwt. sprinkled gently around the open sound-pit, lubricates the vocal chords and assures a steady, even flow of eloquence. N. B.—Idea patented. All rights reserved.

"WILLIE," said his mother, "I wish you would run across the street and see how old Mrs. Brown is this morning."

A few minutes later Willie returned and reported: "Mrs. Brown says its none of your business how old she is."

—*Chicago News*.

THOSE who are interested in the progress of things mechanical must needs keep abreast of the times on the all-important subject of lubrication.

The intelligent use of Dixon's Pure Flake Graphite renders possible a degree of duty for engines and machines that the weakness of any system of plain oil or grease lubrication make hazardous.

THEY CONVINCED THE "BOSS."

PHILADELPHIA PA., Dec. 29, 1903.

*Joseph Dixon Crucible Company,
Philadelphia, Pa.*

Gentlemen:—After a struggle we have convinced the "Boss" that Dixon's Flake Graphite is the only remedy. The amount we use speaks for itself. We wish you a Happy New Year and remain

Yours,

JOHN HAND,
No. 3013 Salmon St.,

RICHARD TELL,
No. 3469 Joyce St.,
Engineers at Dill & Collins Paper Mill.

The above letter is sent us by the manager of our Philadelphia office, who writes that we may consider it worthy of insertion in GRAPHITE. We certainly do. We have many times stated that Dixon's Graphite is a good friend of the engineers, and that the engineer is a good friend of Dixon's Flake Graphite. They both seem to work together nicely in convincing the "Boss" that no journals or bearings can run hot where there is an intelligent engineer and a box of Dixon's Flake Graphite.

IT MAKES A DIFFERENCE.

Man wants but little here below.

When eating a la carte,

But when it's table d'hote, he wants

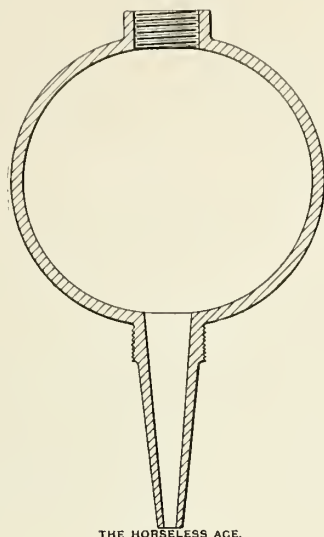
It all, right from the start.—*Yale Record*.

EMERSON has rightly said that "Man is as lazy as he dares to be." Therefore men will use the handy bar belt dressing when they won't go to the trouble of applying a paste dressing. They often let the belt slip a little, which they'd soon stop if there was a bar of bar belt dressing handy. Dixon's Bar Belt Dressing meets all requirements.

GRAPHITE IN CYLINDER LUBRICATION.

In an article in *The Horseless Age*, the well known English engineer, Mr. J. S. V. Bickford, says:

"Graphite is said to be very good for cylinder lubrication.



THE HORSELESS AGE.

The trouble is to get the graphite to the part at which it is wanted. If fed into the steampipe it is apt to collect in a little pile on the spot on which it falls. The best method seems to be to introduce it in considerable quantities at a time directly where required, and leave it to take care of itself. Graphite can be sight fed all right, and the lubricator is the simplest thing possible. Make a hollow metallic ball with a small conical tubular outlet, (see cut), insert this conical outlet into the steampipe, and you have an automatic graphite feeder. To make it a sight feed it is only necessary to insert a "bull's eye." This will only feed flake graphite, however.

"The whole problem of cylinder lubrication is yet to be settled, as well as that of cylinder oils, and when that solution is found, I am afraid the millennium will be near."

In *The Engineer*, of London, Mr. Bickford in speaking of graphite said: "I do not hold a brief for Dixon's people, but as far as I know they are the only people who have made a special study of graphite for lubricating purposes, and as I stated in a letter to *The Engineer* some time ago, I had some of this examined by burning off the carbon in a muffle. The chemist reported that the residue, which was not very much, seemed to be mica. Now, as mica is a good cylinder lubricant itself, when carefully prepared, it stands to reason that the above brand of graphite can be considered good for lubrication."

THE following gem, according to an English contemporary, is to be found on parcels of lead pencils exported to the United Kingdom from Bavaria:

"Stationery Hardware. Be careful not to be broken."

Yet this Bavarian pencil man is said to have a Londoner as his agent!—*American Stationer*.

A MAN named Frye has patented a boiler.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, type-writer work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

OUR LONDON PAGE

All Communications, Inquiries, Etc., relating to this Page should be addressed to Joseph Dixon Crucible Co. (Geo. W. Wollaston, Mgr.), 26 Victoria St., S. W., London.

A LONG RECORD.

It is considerably over forty years since the superintendent of the Dixon mines at Ticonderoga first conceived the idea of graphite paint. He knew, beyond everyone else, the essential qualities of graphite:

(1) Its lubricating qualities. (2) Its elasticity. (3) Its absolute imperviousness to any degree of heat or cold, acids or other destructive or corrosive agencies.

He went immediately to work, prepared the first graphite paint and coated some tin and iron work about the mines. What were his first impressions?

Astonishment at the great covering power of graphite paint, due to the lubricating qualities of graphite, which caused smooth and easy spreading over a wide area. The fact that, owing to the elasticity of the graphite coating, it would not crack under the heat of the sun and the consequent expansion of the metal work; nor would it blister.

Durability was, of course, a test of time, but in a few years this also was proved to be greater than that of any paint previously in use.

So Dixon's Silica Graphite Paint was placed on the market. It went slowly but surely and crept into favor. In course of time its durability was proved with a vengeance. Five, ten and fifteen years, according to conditions of service, it lasted without renewal. In one instance that we know of, five-and-twenty long years of sun and storm were weathered, and still the paint was in good condition.

Meantime the world of painting began to realize that this inspiration of our mine superintendent had furnished the best protective coating ever known—no fantastic concoction of artificial ingredients, but a strictly natural product. Imitations sprang up; other graphite paints appeared and then another striking fact was demonstrated, viz: That only the thin, minute flakes of Ticonderoga graphite, dug from the Dixon mines, would adhere tight enough to metal surfaces to have the desired effect. The imitations were impotent and valueless. The demand for Dixon's Silica Graphite Paint became vast and general. Architects began to specify it; owners of steel and iron structures to realize its saving of trouble and expense of frequent repainting. Now its use is world-wide.

The mammoth office buildings of America, erected with a frame-work of steel—many tons of it, are protected with Dixon's Silica Graphite Paint. The largest bridges and the smallest iron gateways, corrugated iron sheds and gas holders, as well as interior and exterior decorative iron work, all pay tribute to its efficiency and rich appearance.

We in London are young and a long way behind, so far, but are making steady progress. At practically the same time we recently shipped cargoes of our paint to railway companies in India and Asia Minor and to a corporation of a South African city. We are constantly shipping to Holland, Belgium and most Continental countries, in addition to a rapidly growing trade in this country.

We claim only what we have proved. We prove all that we claim. Whether you are a small user; whether you have tons of structural steel, acres of corrugated sheds or merely a tin-roofed hen-coop, you will find no other coating to give such long and economical service as Dixon's Silica Graphite Paint.

A COMPOUND STORY.

I.

He came into our office. "I want," said he, "some of Dixon's Jointing Compound. Your traveler offered this to us and said as much about it that we ordered a trial tin, but our workmen wouldn't touch it. 'Always been used to red-lead,' they said. 'Can't work with stuff like that.'

"We got mad and raved; finally persuaded them to try it. And what is the result? Why, they won't look at red-lead now. They swear by Dixon's Compound. Another tin, if you please."

II.

He came again to our office. "Your joint compound," he said, "is good stuff. We had half a contract putting in a large hot-water installation. We used your compound: other fellows, red-lead. We had several hundred joints to make and did it in fine style; never a leak at all, at all. We beat the other fellows by hours and now their joints are leaking like the deuce."

MORAL.

You come into our office or go to your local dealer, order a tin of Dixon's Pipe Joint Compound, use it on all pipe-fitting work and, when overhauling machinery, daub a little of the compound on the shanks of bolts, flanges of cylinder heads, gaskets, nuts and wherever metal is fastened against metal. It will prevent rust and consequent decay. You will be happy ever afterwards.

PREVENTS SLIPPING. INCREASES POWER.

Messrs. Hearn Bros., wholesale chair manufacturers, High Wycombe, write: "Respecting your Solid Belt Dressing, this is by far the best we have ever used, as we have tried several."

We know this firm has bought special dressings at one time and another and have used preparations of their own. The above testimonial, therefore, is all the more valuable as to the merits of Dixon's Solid Belt Dressing. We guarantee that it will prevent slipping and stop belts from slipping that have already begun. Put up in very handy and convenient one-pound bars.

A NEW GRAPHITE LUBRICATOR.

We have had under notice for some time a new and what appears to be a perfect lubricator for feeding Dixon's Pure Flake Graphite into engine cylinders. It represents years of study in improved methods of graphite lubrication. We hope to give fuller particulars shortly. Meantime, if any of our readers are interested, we shall be pleased to pass their inquiries on to the manufacturers.

Graphite

Vol. VI.

AUGUST, 1904.

No. 9.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

COPY FREE ON REQUEST.

COPYRIGHTED BY THE JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J., U. S. A.

"GRAPHITE AS A LUBRICANT."

(Eighth Edition, Revised and Enlarged.)

The engineer who, hearing about the benefits to be derived from the use of lubricating graphite, searches his library and reference books for information upon the subject, will be greatly disappointed to discover how very few articles are available for his information. There are, however, few text books on lubrication that do not mention graphite, but their references are, in all instances, as far as we have been able to discover, only casual and do not in any way supply the information that would enable the engineer interested in the subject of graphite lubrication to supply himself with the necessary facts concerning its exact position in the mechanical world.

Not long ago, an engineer of our acquaintance wrote to an eminent testing engineer, with whom he had been asso-

ciated, asking where we might find comprehensive literature on the subject of "Graphite Lubrication." The reply that he received was to communicate with the Joseph Dixon Crucible Company, whose literature was the most authoritative published on this subject.

The graphite industry, as it exists to-day, may be said, with no exaggeration, to be marked by the growth of the Joseph Dixon Crucible Company, now in its seventy-seventh year.

Graphite for lubricating purposes, as used in some enormous quantities for so many different classes of machinery, has come into its present prominence very largely because of the progressiveness of the Dixon Company in placing within the reach of engineers the quality and grade of graphite which they can use even in very delicate situations. Thus the Dixon Company, from the earliest days, has been the headquarters for graphite knowledge.

The realization of these facts has been kept before us in preparing the eighth edition, revised and enlarged, of "Graphite as a Lubricant," a booklet of the Dixon Company, devoted to the subject of "Graphite Lubrication." We have aimed, throughout the chapters of this booklet, to set forth the most important points, not only of practice but of theory with respect to the exact action and value of lubricating graphite. There is no end to the chapters we might have filled by narrating the experiences of practical

engineers and mechanics with graphite, but we have endeavored to supply the chief facts so that an intelligent



idea of the subject might be presented to those who are seeking information.

We would be glad to place a copy of this booklet into the hands of every practical man interested in attaining better lubrication for machinery of every class. We know that the principle of using pure flake graphite as a lubricant is as sound as the results are satisfactory, and that only good can follow its judicious use.

GRAPHITE FOR BOILERS.

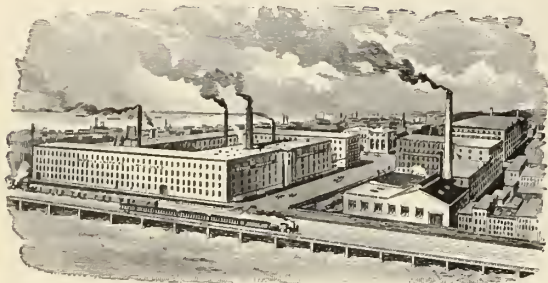
A correspondent writes us as follows: "We find that graphite is as useful in its way for the interior of boilers as it is in the form of graphite paint for exterior of boilers, such as boiler fronts, valves, pipes and iron work used in boiler setting.

"We paint the inside of our boilers to prevent scaling and know of other people who do the same, and we have seen samples of scales that were removed from a boiler where graphite had been used which showed a very thin and even scale, and the engineer who had the boilers in charge, claimed that it came off the tubes with very little jarring, and traces of the graphite can be plainly seen so that an argument that appeared in one of the trade papers sometime ago that graphite for the interior of boilers was 'detrimental,' does not seem to be in keeping with facts."

ESTABLISHED 1827.



INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

BRANCHES AT

68 Reade St., New-York. 1020 Arch St., Philadelphia.

304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Pittsburg, Paris, Hamburg, Vienna,
Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen,
Warsaw, Barcelona, Bergen, Horgen (Switzerland, Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.

CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., August 1904.

A MACHINIST AND HIS PROBLEM.

He Solves It By Means of Thin Asbestos Mill Board and
Dixon's Flake Graphite.

Not long ago one of our people was talking with an expert automobile machinist and he was told the following incident which will undoubtedly be of interest to our readers:

He was called upon to make a hurry repair on an automobile engine, the cylinder head of which leaked badly at the joint. He made no less than twelve unsuccessful attempts to pack this joint tightly; he tried rubber packing, sheet lead, paper, copper, tried painting the surfaces with red lead; tried to make a rust-tight joint with salt water; tried to corrode a copper gasket on tightly and tried several patent packings of one sort and another, but a lastingly tight joint could never be secured. Finally thin asbestos mill board was thoroughly painted with boiled linseed oil and a gasket cut from it. This was thoroughly coated with Dixon's coarse flake graphite and that did the trick perfectly.

This happened seven months ago, so the machinist told us, and the head has not leaked a particle since then. This same packing of waterproofed asbestos board, coated with graphite, has been pronounced by many practical engineers the very best flange-joint packing obtainable, as it resists the softening action of water or steam and allows a perfectly easy separation of the joint at anytime without the slightest tearing of the gasket.

It is often a very good idea to coat the gasket with graphite on only one side and then the uncoated side sticks to its flange while the graphite allows perfectly easy separation of the joint without the destruction of the gasket, even though the joint be very frequently broken.

LONGINGS.

When days grow long and summer heat
Like a furnace glows on roof and street,
When the leaves of the city's trees are dry
And shrivelled beneath the burning sky,
Nodding and dozing there comes to my brain
The musical words of an old refrain
That rings in my ears the livelong day,
It is, "Over the hills and far away."

Where mighty trees cool shadows throw
On mossy banks and ferns below,
When the quail pipes in the early morn,
As he leads his flock through rustling corn,
Where the fishes leap in the river's tide,
And under the roots of the willows hide,
And, freighted with fragrance, soft winds play
"Over the hills and far away."

The hum of the bee, that uneasy rover,
As he gathers sweets from the purple clover,
The robin's song at the close of day
As twilight drops her curtain gray,
To draw a long new breath of life
Far from the city's noise and strife,
And to hope that I may go some day
"Over the hills and far away."

—LUCY M. STOCKING, in *St. John's Bulletin*.

DIXON'S GRAPHITE AXLE GREASE.

"A Satisfied Customer."



The following little letter tells the story fully and completely:

J. C. FREDERICK,

HARDWARE AND STOVES,
104 West Main St.,

OWENSBORO, Ky., July 1, 1904.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

GENTLEMEN:—Your favor of June 25th to hand and noted. I should be pleased to have you send me samples and circulars and will use my best endeavor to have them properly distributed. Whenever we can induce a customer to try your axle grease we find they will buy it again, although from a dealer's standpoint—"A pound of it really runs too many miles." Yet he has a satisfied customer.

J. C. FREDERICK.

"A SMALL point to remember in card etiquette is, that in adding a name to an engraved card, when it is desired to announce a second person, the inscription should be made with a pencil rather than a pen. This is a trifling nicety of form that denotes knowledge," says *Harper's Bazaar*. To this we can only add: Be sure, be quite sure, the pencil is a Dixon American Graphite.

"THE THREE GUARDSMEN."

The Men Who Superintend the Mining and Milling of Graphite at Graphite and Ticonderoga, New York.

Two hundred and fifty miles from the seat of government of the Dixon Company are located the company's graphite mines and mills. The property is not far from Lake George and includes hundreds of acres of mine and woodland, besides buildings and machinery representing values amounting to several hundred thousand dollars.

Upon the shoulders of three men rests the responsibility for the successful and economical management of the graphite mines, the milling processes and all the attendant details.

In the hands of William O'Connell, Alfred Gray and George B. Bascom the Dixon Company has every reason to believe that its interests and properties are safely guarded and cared for.

We are proud of "The Three Guardsmen" and, in order that they may see themselves as others see them, and that all may know them as they are, we print their pictures and add the readings of that most accomplished phrenologist, Miss J. A. Fowler, of the Fowler & Wells Company, New York. The phrenological readings of character were made from picture only with no knowledge of the men or the positions they hold, but we, who know the men, can vouch for the correctness of the readings.



WILLIAM O'CONNELL.

The breadth of this gentleman's head in his temples marks him out among his fellowmen as one possessing more than ordinary originality of mind and capacity to do a variety of work, and the breadth of head at the base, above the ears, is a sure indication of remarkable energy, force and executive power.

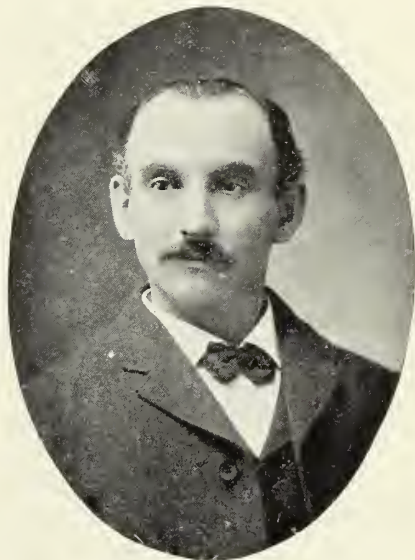
He is a quiet, unassuming, practical business man. He uses no flowery language; he is not what one might call an eloquent speaker, but he knows his business and is very direct in his style of speech, his manner of delivery and his way of doing work.

This man should make an excellent financier, and should know how to economize the funds of a company; he will not lay out recklessly, or for useless show, any sum that could be used for a better purpose. He hates shoddy of any

kind and will always use the best material when building up a business; hence his work will never fall to pieces, and he will be one to be consulted on many important subjects that would escape the attention of the casual observer.

He is a man who will prefer to deal in large projects; in fact, the larger and more comprehensive the work, the better he will like it, but one never hears him brag about what he is going to do. He lets his work speak for itself. He likes the unvarnished truth, however bitter and unpleasant it may be to hear, but he never thanks anyone for smoothing things over in such a way that they are untrue when presented. He is a man of sterling qualities. The world would be better if he were duplicated by the thousand.

He has a singular combination of modesty and independence of mind which show themselves at different periods of his life and work, and will be known for his originality of mind, his general economy of material and funds, his executiveness in starting others to work, and for his love of plain speech, for he always calls a spade a spade.



ALFRED W. GRAY.

Mental absorption and interest in his work characterize this gentleman. He is not a time-server, and whatever he is doing absorbs his mind so fully that he cares but little for what is going on outside of it. Were he bringing out a patent, he would sit up all night, in fact many nights, to complete his ideas. He does not thank anyone to disturb him—even to tell him that the hour of closing has come or that dinner is ready. He is no eye-server; hence will finish what he is doing in spite of opposition and hindrances.

He is quite artistic, could draw out patterns, make suggestions, invent machinery and contrive a hundred and one ways of doing the same thing.

He can see where the screw is loose, where the link is missing and can solve a problem much more easily in writing than in speaking, unless he writes his speech and reads it.

He is clever in analyzing, discriminating and differentiating between material as well as between ideas. He will know how to select the best and discard the worst, and his judgment can be relied upon; but he will not do so well as

a ready salesman in business or a pleader before a jury. Every word he utters has a meaning, but he does not talk enough in the general sense of the term to be properly understood.

He remembers forms and outlines well and is able to carry in his mind's eye what he has seen in an exhibition; hence he can reproduce a thing from memory after he reaches his office, if he has not been able to take notes at the time when he examined a thing.

He is a little too retiring, but men will seek him out when they want his ideas, and he will always have more work on hand than he will be able to easily get through or accomplish.

His imagination gives him a good deal of inspiration and resourcefulness of mind, and he will bend a steel wire into many shapes before he is satisfied that he has got the right shape.

He is a man who can be depended upon, and the more he is known the better he will be appreciated and liked.



GEORGE B. BASCOM.

The photograph of this gentleman indicates that he has a well-poised character.

The head is finely proportioned, the features are distinctly marked and there is solidity, reliability and enthusiasm stamped upon his face and brow in an unmistakable way. When he says a thing he means it.

He does not hunt for spots on the sun, nor specks on a person's work or character, but he is very quick to detect errors, and these he will never allow to pass unaltered, for he aims at perfection in everything he does and knows how to secure it from those who work for him.

He should make an excellent organizer—a man to influence young men who are just passing out into the arena of life. He inherits a magnetic personality, and either as a business man or as a public speaker he will always win the respect and confidence of others.

He is a man who possesses original ideas; hence he is resourceful and capable of making the most of any material that he may handle.

He has excellent moral qualities, and these will make him a man sought by any church that he attaches himself to as a trustee, superintendent or reformer; hence in a business he will carry his moral insignia with him. He is kind-hearted almost to a fault, yet he has great strength of will and purpose which dignify his work and make him very persevering in his efforts.

He is a man who can create business and should be where he can meet with men and create a favorable impression and talk up a business or present things in an acceptable way. He will be known for his polished manners, his availability of mind, his resourcefulness of character, his desire to perfect a thing as far as possible, his intuitional understanding of men and how they can be handled.

DIXON'S WATERPROOF GRAPHITE GREASE.

Its Value on Shipboard for Lubricating Winches, Capstans, Rudder Chains, etc.

Upon such exposed surfaces as deck winches, capstans and general machinery of that character on board ship, no lubricant serves so admirable a purpose as Dixon's Waterproof Graphite Grease.

This grease is one of heavy body and is almost wholly mineral in composition. It carries a large percentage of the world-famous Ticonderoga Flake Graphite, and on account of the presence of graphite and the heavy body of the grease it is not readily squeezed out, even by very great pressures. It possesses a very high lubricating value where its heavy body is not objectionable, such as on slow moving machinery or under heavy pressure. In addition to these characteristics it has a remarkable tenacity and adhesiveness and resists the action of fresh or salt water. It contains no soluble ingredients, and if applied either as a rust-preventive or as a lubricant to exposed machinery it gives excellent results. It cannot become rancid, gum, nor cause corrosion under any circumstances, and as a rust preventive it is unsurpassed.

As a lubricant for gears it will be found most satisfactory, inasmuch as it almost wholly reduces wear. Its strong waterproof characteristics is an addition to its other valuable features, and must not be construed as in any way detracting from its wide usefulness as a general heavy lubricant.

There are few applications for this grease where its peculiar properties are more appreciated than on shipboard, and many marine engineers have spoken most highly of it.

One engineer of our acquaintance was especially pleased with this grease for pump plungers and the guides of several of his auxiliary engines, where he had previously experienced much difficulty in procuring any lubricant that would stay in place.

This grease is thoroughly described in a little booklet which the Dixon Company have just issued, and copies of this will be sent free to all who are interested.

Dixon's Graphite Pipe Joint Compound well meets the severe conditions of a dyehouse or chemical works. It has a body of Dixon's Pure Flake Graphite, which is unaffected by water or acids, and owing to its non-"setting" and lubricating qualities, it makes possible any easy-breaking of joints without injury to pipe fittings or tools.

USES OF FLAKE GRAPHITE ON SHIPBOARD.

II. The Lubrication of Stern Bearings.

By H. H. RAABE, M. E.



All marine engineers are familiar with the ordinary type of stern-bearing and a detailed description of the bearing is unnecessary. The lubrication of such bearings has, in most cases, been left to the water circulating through them, although water is a very poor lubricant. In fact the result is not very much better than if the bearings were running dry, except that the water prevents overheating.

In order to apply graphite to the stern-bearing the clearance in the stern-tube should be reduced as much as possible. In wooden vessels the stern-tube is generally formed by part of the "deadwood" of the stern and is lined with lead, giving usually about one inch of clearance around the shaft. The bearing itself usually consists of a brass bushing into which strips of lignum-vitæ are dovetailed with free spaces between them as in Fig. 7. The writer's method has

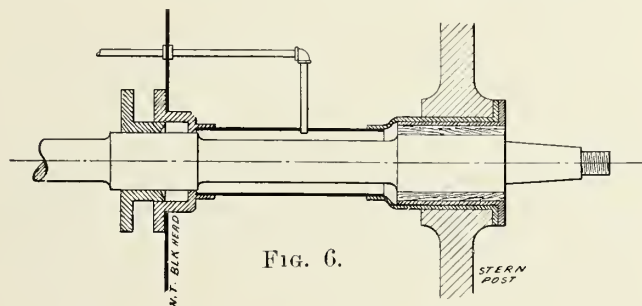


FIG. 6.



FIG. 7.



FIG. 9.



FIG. 8.

been to fill the space between the lignum-vitæ strips for about $1\frac{1}{2}$ inches from the aftermost end of the bearing with pieces of soft wood, except one or two of the lowest spaces, as shown in the section Fig. 8.

The filling strips should be about one-sixteenth to one-eighth of an inch lower than the lignum-vitæ strips, so that they will not touch the brass sleeve of the tail-shaft. The main length of these spaces being left open, was then filled with the graphite compound referred to in the previous article, namely, one part of tallow softened by heat, with which an equal part of machine oil is thoroughly mixed, and then a third equal part, by bulk, of coarse flake graphite added until the entire inner surface of the bearing was flush. This is an easy matter if the ship is in dry-dock and the tail-shaft has been removed. But if the tail-shaft has not been taken out of the tube the compound can be stuffed into the open spaces around the shaft and the filling strips driven in afterward. Of course the propeller has to be removed for this operation. In any case it is best to saturate the strips of soft wood with machine oil before driving them in.

If it is possible, the clearance space around the shaft should be reduced by lining the stern-tube with wood and lead. If this should be impractical, spent grease taken from any part of the engines or auxiliaries, or even from the bilges, may be mixed with graphite and the space filled up as much as possible. The grease used for this purpose does not need to be of good quality. For, at any rate, it is always better than the grit that will enter the stern-bearing when the vessel is in shallow water.

The stern-tube should be tapped in some convenient place and the lubricant may then be led to it by means of a pipe and a large compression cup. A spring compression cup will not answer this purpose, as it would require a very strong spring to force the grease through the pipe and stern-tube and out through the stern-bearing, and as it is not necessary to have a continuous feed, a screw compression cup will answer the purpose. A turn of the screw-piston every half hour is sufficient to keep the bearing well lubricated. The lubricant being the waste from the thrust bearing, etc., costs practically nothing.

Fig. 6 illustrates a typical stern-bearing and shows the connections for supplying the graphited grease.

The outboard bracket-bearings of twin-screw steamships may also be lubricated in a similar manner, and in those cases especially the writer has obtained remarkably good results.

The bracket-bearings of a twin-screw hydraulic dredge, that was under the writer's care, used to wear so rapidly that the lignum-vitæ liners, and several times even the entire brass bushings, had to be renewed every six months. The cause of this rapid wear was the amount of sand that the vessel necessarily stirred up during its day's work. This had a free passage through the bearings and caused them to wear so rapidly that on two occasions the brass sleeve of the shaft was found to be wearing on the cast iron hub of the bracket, having worn completely through the bushing. This, of course, threw the shaft seven-eighths of an inch out of line on a length of about fifteen feet, which certainly did no particular good to the shaft and its bearings.

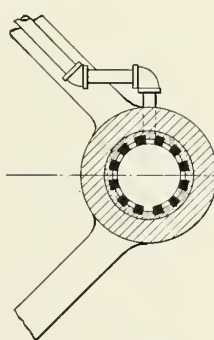


FIG. 10.

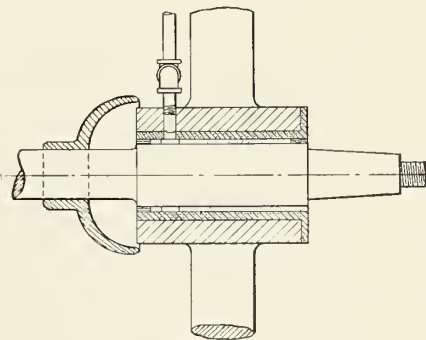


FIG. 11.

In the application of graphite lubrication to this particular stern-bearing, remarkably good results were obtained and the improvement was very apparent. The bearings were of the outboard type, the forward end being partially protected by a gauntlet fastened to the outboard shaft, as shown in Fig. 11.

After fitting a new bushing with lignum-vitæ wearing strips, the latter were partially cut away near the forward end of the bearing, and filling strips of the same soft wood, as described above, driven into each end of the bearing. The filling pieces at the forward end of the bearing were designed to fit closely to the brass sleeve, while the after ones were given one-eighth of an inch clearance. In the lowest space, no filling-piece was used at the after end of the bearing, as also shown in Fig. 10 and Fig. 11.

The top of the bracket-hub was then drilled and tapped for a $1\frac{1}{4}$ inch pipe, which was led along the bracket and thence through the plating. Inboard a screw compression grease cup was attached to the pipe. Both the starboard and port bearings were thus equipped.

A $1\frac{1}{4}$ inch hole was also drilled into the brass bushing to match with the tapped hole in the bracket-hub. The bushing was then put into place and the bearing was in proper shape to be lubricated. The mixture of graphite and grease, already described, was used in this case also.

This arrangement proved so satisfactory that the bearing strips had to be renewed only after three years and a half of hard service. But even then the old bushing was used again. The bearing strips had worn only three-sixteenths of an inch, while formerly the wear amounted to one-half of an of inch lignum-vitæ and three-eighths of an inch of brass in about six months under precisely the same conditions.

The advantages of such lubrication will be easily seen from this example, and these suggestions are well worth the attention of marine engineers.

Care should be taken that the graphite compound is not mixed too stiff for stern-bearing lubrication, as the cold water circulating around the feed-pipes and bearings will keep it at such a low temperature as to prevent the easy flow of a stiff grease. The grease taken from the thrust-bearings, etc., should be mixed with an extra amount of common engine oil, the thinness of the mixture depending entirely upon the temperature of the water.

DIXON'S GRAPHITE CUP GREASES.

A New Pamphlet Which May Throw Some Light on the Much Discussed but Unsettled Question of Oil vs. Grease Lubrication.



In a new booklet, just issued, we have presented certain facts of practical experience and observation, with the hope of throwing some light upon the much discussed and still unsettled question of "Oil vs. Grease Lubrication." We will not introduce the controversy here, assuming that there are cases in which a good cup grease gives better service than oil; but we desire to point out briefly the advantages of Dixon's Graphite Cup Greases over plain cup greases and to indicate the exact purpose and benefit of adding flake graphite to greases.

The average shop or factory presents many conditions that are not taken into account in the oil-testing laboratory—imperfection of workmanship, carelessness or indifference of employees, dust and dirt with varying temperatures and loads. The rule governing the choice of lubricants must

be made to read: Use the thinnest oil or grease that will keep the bearings cool under the conditions of actual service and reduce wear and tear of machinery to its lowest point.

Though any waste of power from excessive friction is to be condemned, it is even more important that nothing should happen which could cause a shut-down or necessitate laying up for expensive repairs. The saving of coal by a change of lubricants is not to be compared to the importance of preventing shut-downs and lessening the wear and tear and repairs to machinery. Grease can be made with low viscosity—lower in fact than many much-used oils and, therefore, no objection can be raised to the use of grease, provided a suitable grease be selected for the work in hand.

Exhaustive experiments and years of practical experience have proved that the addition of pure flake graphite to oils or greases enormously increases both their efficiency and endurance, enabling a given oil or grease to do heavier duty than would otherwise be possible or, to express the same thought another way, if pure flake graphite be used, a thinner, less viscous oil or grease may be employed with entire safety and satisfactory results. Graphite imparts to friction surfaces a wonderful smoothness that relieves oil or grease of a very considerable portion of its task of keeping the microscopically rough surfaces apart.

For purposes of lubrication, graphite in the thin, flaky form is recommended because of its greater purity and because the thin flakes adhere much more closely to metal surfaces.

The pure flake graphite from the Dixon Company's famous mines at Ticonderoga, N. Y., is especially desirable because of the thinness, purity and uniformity of the flake. This graphite, mixed with suitable lubricants in the proper proportions, forms the many graphite greases of the Dixon Company, and is their vital part.

The action of Dixon's Flake Graphite is that of filling up low spots, scratches and the rough grain of the metallic surfaces, forming thereby a perfectly even, tough glaze of exceeding smoothness on the rubbing surfaces and reducing the necessity for more than a relatively small quantity of oil or grease. It enables lighter, thinner lubricants to give remarkably good results. Cutting of a bearing surface thus coated is impossible and there is a great reduction in the natural tendency of bearings to either warm up or over-heat. Graphite prevents direct metallic contact and very largely reduces wear of parts coated with it. The thin veneer or layer of flake graphite takes up whatever tendency to wear there may be and is thus expended and must be renewed.

If a certain oil or grease is found to lack sufficient body for a given duty, pure flake graphite may be added to it in small percentages, say 2% to 8% by weight, depending upon the circumstances, and this will so greatly improve the condition of the rubbing surfaces that the oil or grease will be found to have ample body for the work.

As long as graphite allows the use of thinner, less viscous and probably cheaper oils and greases, the engineer needs no urging to use them, if he can do so with entire satisfaction.

To suit various needs, the Dixon Company manufactures a variety of greases. Although great benefit is to be de-

rived from adding Dixon's Pure Flake Graphite to ordinary greases, close attention must be paid to the proportions in order to secure the best results.

Dixon's Graphite Cup Greases possess the peculiar merit of having the lubricating qualities of the best mineral oils and, at the same time, being in semi-solid form, are simple, cleanly and economical in application. These greases, being composed almost entirely of mineral oils, are fluid the moment they reach the journal, the lubricating effect being that of regular oils with none of their disadvantages.

They are remarkably soft, as compared with ordinary cup greases, and yet sufficiently solid to prevent their being wasted. The viscosity of these greases is very much lower than that of any other greases of anything like equal efficiency.

Dixon's Graphite Cup Greases are made in six degrees of hardness—Nos. 0, 1, 2, 3, 4 and 5 respectively, No. 0 being the softest—about the consistency of soft vaseline. No. 5 is the hardest and has a consistency about that of tallow, but with somewhat more cohesiveness. The softer grades are extremely valuable in the lubrication of light, high-speed spindles and may be fed by means of compression cups or in open bearings. The harder grades are suitable for work more severe, so far as pressure is concerned. They have sufficient body to stay in place, even at very slow speeds and high pressures.

All of these greases may be fed through compression cups, the higher grades, of course, requiring greater compression and larger opening. In general they may be used in exactly the same manner as any other greases of corresponding consistencies. As no animal fats enter into their composition, no fear of corrosion, even of composition metals, need be felt.

These cup greases have one characteristic which is peculiar to them. They retain their ordinary consistency through a large range of temperatures. For instance, there is very slight variation of, say, the No. 3 grease between 40 and 140 degrees; so they have a larger range of usefulness when temperature conditions only are considered than any of our other greases. This characteristic is common to Dixon's Graphite Cup Greases, which may be used on almost every kind of machinery, stationary engines, locomotives and marine engines; on refrigerating, wood-working and textile machinery; in machine shops, paper mills, flouring mills, and stamp mills; in short, in almost every industry where power is employed.

They may also be used in all kinds of cups or open bearings on shafting; pins, slides and bearings of almost every character. The higher numbers, 3, 4 and 5 respectively, are indicated in places subjected to a comparatively high degree of heat from outside conditions; for example, the heat of engine and boiler rooms or steam pipes in proximity to the cylinders of internal combustion engines.

They are recommended as most excellent marine lubricants, assuring cool and smooth operation of thrust, tunnel-shaft and main bearings, as well as auxiliaries.

For the lubrication of various bearings of automobiles and motor boats, these greases will be found in the highest degree satisfactory.

GRAPHITE FOR THREADED CONNECTIONS.

Some Observations Upon the Superiority of Dixon's Graphite Pipe-Joint Compound Over Cemented or Metal-to-Metal Work.



The up-to-date man laughs at the ancient tradition of using red lead or white lead for general pipe-fitting. Red lead sets or hardens very rapidly, cementing the joints so firmly that the fitting is practically welded to the pipe and separation is nearly impossible.

We hear a good deal of talk these days about fitting pipes metal to metal, only using a little lubricating oil on the threads to facilitate screwing-up. It may be possible to cut threads on pipe and fittings so accurately and uniformly that the parts will fit closely together, metal to metal, and make a tight joint with nothing needed to fill up the chinks. This, however, is more a theory than a condition. Dies and taps wear loose in machines and orders are rushed out of shops and factories without the care necessary for perfectly accurate threads on pipe and fittings. There is a corresponding difficulty in fitting metal to metal joints so that there will be no leaks.

Where oil is used alone, the joint can be screwed up without any trouble and, for a time, is perfectly tight but not permanently so, as the oil is burned out and otherwise destroyed. When the oil has worked out, rust rapidly works in between the threads and forms a rust joint that is about as difficult to open as when made up with red lead.

If joints are screwed up with graphite on the threads, the graphite will be thoroughly distributed over the surfaces, filling in all the smallest chinks and pores in the metal, forming a good, smooth, impervious coating of lubricant and rust-preventive that enables the joint to be opened many years after.

Only a very small amount of graphite is necessary to absolutely prevent rust forming in the joint, and the high lubricating quality of graphite enables the fitter to make a tighter joint than with any other substance. The layer of graphite on perfectly cut threads is so extremely thin that all the advantages of a metal to metal joint are obtained with none of the disadvantages of rust and sticking.

The very best form of graphite obtainable for pipe-fitting uses and, in fact, for all other threaded connections, such as bolts, nuts, etc., is Dixon's Graphite Pipe-Joint Compound. Manufactured for over a quarter of a century, it has stood the test of time and is the only compound of its sort officially recognized throughout the country.

The Dixon Company has just issued a new booklet on the subject of their Graphite Pipe-Joint Compound and will be glad to send copies, together with samples of the compound, to all interested.

Dixon's graphite publications are sent free of charge to all who are interested in the subject of graphite.

SOMETHING ABOUT BELTS AND PULLEYS.

By W. H. WAKEMAN.

When an author is about to begin an article relating to steam engineering or mechanics, he must choose between two courses, both of which have good and bad points. If he frequently states that matters referred to relate to the plant in his charge, some readers are sure to think that he is trying to advertise the fact that he has charge of a plant, which is not an extraordinary state of affairs, as viewed from the reader's standpoint. However, if some of them should secure positions as engineers in various plants, and after one year of this work they should fully express their opinions, it would be voted the hardest days of their lives, provided all duties of their positions are faithfully discharged on time.

Nevertheless, facts gleaned from an engineer's personal experience are always interesting and instructive.

If he mentions facts in his article without stating how the information was secured, some readers are sure to conclude that the matter he presents is borrowed from others without intention of repaying the same, or else it is only given as a theoretical treatise whose value is unknown. I suppose that a portion of his interested followers give him credit for basing remarks on actual experience, which is frequently proper, as it seems unnecessary to always state definitely the source of information, so long as it is known to be correct.

This article is based wholly on personal experience, so there is no chance for mistake about it. In 1878 I was placed in charge of a portion of the machinery in a mill, including the engine and boiler, and soon afterwards I discovered that my predecessors had used a novel but effective article for preventing belts from slipping. It was nothing more nor less than common coal tar.

In those days we did not know how many beautiful things could be extracted from the unpromising substance, therefore I was scandalized and horrified at the idea of putting it on a belt. It is only fair to say, that while that uncomfortable feeling in regard to its use for that purpose gradually disappeared and gave no trouble for a time, it has returned in full force and will probably not depart.

I have never seen anything like it for fastening belts to pulleys, for, when first applied to a belt, it had no more chance to slip than a train of gears; but the after-effect on both pulley and belt was something fearful to behold.

For several minutes after an application, consisting of pouring it on, the air was full of distressing sounds resembling the tearing assunder of hundreds of sheets of stout paper, for when the belt parted from the pulley, the protests were loud and penetrating.

The air was full of floating dust whenever the mill was in operation and, as this mingled with the tar, lumps of various shapes and sizes formed on the face of our pulleys until we hardly knew what diameter to call them.

It made belts hard and brittle, but when one was worn out, we bought another and kept on applying the coal tar, because it cost but little and could always readily be obtained. It absorbed much power in tearing pulley and belt apart (that expression is correct), but this feature was not a disturbing element at that time.

After continuing the use of this unprofitable and disagreeable article for years, somebody suggested that we send for a sample of Dixon's Traction Belt Dressing. Acting on this, it was secured and given a trial. Nothing exceeds coal tar in holding power, when first applied, unless it is glue; but the advantage of this excessive holding power is balanced by the power required to part the belt from pulley when it comes to the point where its work is done.

We found that Dixon's Traction Belt Dressing would cause a belt to hold its place while carrying any load that ought to be put upon it and, at the same time, it parted from the pulley comparatively easy, at the proper time, therefore it was pronounced a superior article.

In addition to these good qualities, it kept our leather belts as pliable as could be expected, after the abuse they had received, thus preventing them from failure by cracking before they were worn out by legitimate use. The coal-tar keg was consigned to the scrap-heap.

This reminds me of an incident that happened in a box factory. One of the saw arbors began to heat for lack of lubrication, causing excessive friction, which in turn made the belt slip. The sawyer put powdered rosin on the belt to prevent slipping, and continued the use of the saw until the appearance of Babbitt metal on the floor gave more emphatic notice that it was time to stop unless it was desired to burn up the shop.

For a long time afterwards the expression, "Put some rosin on the belt," answered for a by-word in that shop, whenever a bearing began to heat from any cause.

While I have never known of coal tar being used in more than three mills, rosin is much more in evidence; but both of them are relics of barbarism in engineering and mill work, and therefore have no place in our manufacturing world of the present time. They should be permanently discarded, and the belt dressing above mentioned used instead.

After the arduous labor required to keep our plants in operation, week after week, often in an atmosphere that would not be tolerated by workmen in other lines on account of heat, coal gas, etc., great relief is felt when the season for a short vacation arrives and we camp out for a time in the midst of trees waving in gentle breezes, brooks that babble over their stony beds; birds that pour forth their musical notes; squirrels that leap from tree to tree; wild flowers that bloom and please both sight and smell, while the novelty of "roughing it" adds new zest to life and invigorates the whole system, preparing us for better work in the future, thus proving beneficial from every point of view.

It has occurred to me in the past that some of these experiences were somewhat rougher than is actually required, as, for illustration, when a heavy rain came down during the night, some of the water penetrating our tent, first causing unpleasant dreams, followed by an awakening that was at first ludicrous, then unpleasant and finally exasperating.

The result is that we now occupy a small cottage during these brief intervals of rest, a front view of which is shown in Fig. 1. Doesn't look very elaborate, does it? Well, it answers every purpose, and nothing more is required.

Happy days are spent here every year, especially as other cottages are close by, filled with friends that look forward

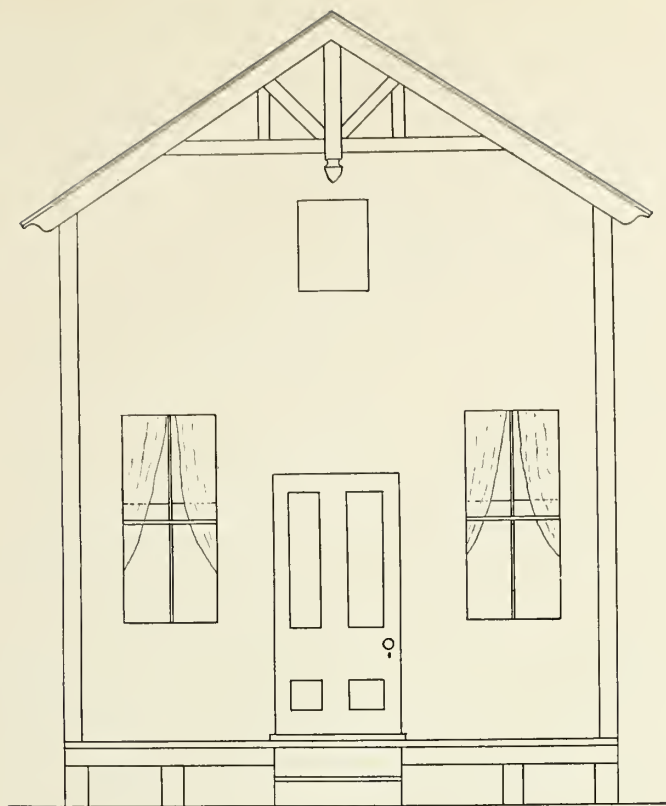


FIG. 1.

to the annual encampment with pleasure and enjoy its privileges. When rain comes down in torrents, while it is yet dark, we think of the tent we used to have, are satisfied to leave it with past memories and come forth in the morning dry and comfortable.

A portion of this roof consists of roofing paper nailed to smooth boards and covered with a generous coat of Dixon's Silica Graphite Paint. This makes a light and inexpensive roof that is perfectly tight under severe test and it proves durable. I cannot state how long it will last, but it has proved satisfactory in my case for four years and is apparently good for many more. It has not been repainted.

This roof is actually used for only about two weeks in the year, yet it is always exposed to the weather the same as other roofs. It is in a grove and, therefore, it is nearly always shaded by trees. People who have given these matters due attention will readily admit that this condition is very unfavorable; hence if it gives satisfaction here, it will elsewhere.

I have recently painted a tin roof with this kind of paint and, although it has not been in use long enough to boast of, yet it has the appearance of giving very satisfactory results.

As the title of this article refers to belts that travel fast and pulleys that revolve swiftly, readers may think that reference to quiet scenes, while camping out, have no connection with this machinery; but from my point of view the two subjects are closely connected, for, by successfully using belts, pulleys, etc., we earn money that enables us to enjoy the more quiet scenes. Therefore, not only a strong but a vital connection exists between the two subjects.

Dixon's graphite publications are sent free of charge to all who are interested in the subject of graphite.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequalled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, type-writer work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

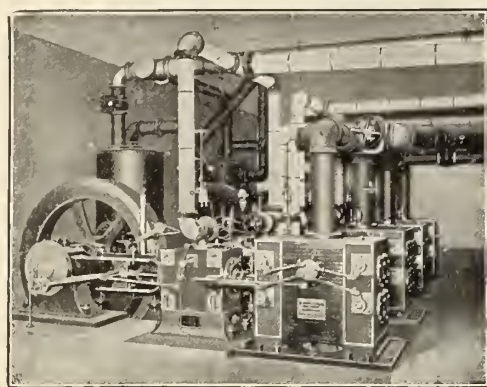
Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

FLAKE GRAPHITE FOR THE LUBRICATION OF AIR COMPRESSORS.



Certain important conditions are presented in the lubrication of air compressor cylinders, not encountered in the case of steam cylinders.

Dust and grit drawn into the cylinders through the intake frequently set up destructive grinding. The heat is dry and tends to carbonize cylinder oils, especially compounded oils, clogging the outlet valves and choking the discharge pipes. If an oil of too low flash-point be used, explosive vapors are formed which high frictional heat at some point may accidentally ignite. A number of frightful explosions of air receivers have been traced to this cause.

Dixon's Pure Flake Graphite imparts to cylinders a wonderful smoothness and polish, filling in and overlaying all irregularities, scratches and the rough grain of the metal, provides a firm, new surface, enduring any temperature, reducing frictional resistance and wholly ending all groaning, grinding or cutting. If desired, the supply of oil may also be greatly reduced.

The Dixon Company has just published the eighth edition, revised and enlarged, of "Graphite as a Lubricant," discussing in detail the theory of graphite lubrication and its practical benefits. Copies will be sent upon request.

ARTIFICIAL CAMPHOR.

The "*Scientific American*" tells us that the distant and uncertain supply of camphor, the gradual destruction of its trees, the length of time required to grow new ones and, lastly, the camphor monopoly, have stimulated chemists to devise a process of manufacturing camphor synthetically.

And now, within twenty-five miles of New York City, at Portchester, a plant has been erected; the science of chemistry is doing its work, and a natural product of world wide utility, but of heretofore limited and distant supply, is being manufactured on a commercial scale.

The substance obtained by the process is camphor—true camphor artificially produced.

A TURN or so of every threaded joint, or pipe or bolt with a closer, better fit, is easily obtained by the use of Dixon's Graphite Pipe-Joint Compound.

The ease of fitting and separating joints, the tightness of all connections and the great number of its uses, give this compound a valuable place in the kit of every user of the monkey-wrench or pipe tongs.

THE MARGIN.

A local Jersey City school this year swept away the time-honored system of having the scholars occupy the platform at Commencement. In this way, the Valedictorian, the Salutatorian and the Class Poet were taken for granted and, in their stead, a professional speaker of high rank addressed the crowded audience.

The speaker was Prof. Edward Howard Griggs, well known at Chautauqua, New York City and Brooklyn. His address was clever, clearer than crystal and adapted to the audience and, for an hour, on a hot evening, he held the house spellbound. His topic was: "What Shall We Do With the Margin?"

He explained the function of a margin to business success. A business that only pays expenses is doomed to fail. Without a margin a business is already in the very act of failure. What the business man does with his margin points out the future of the business. So this complex affair we call life is governed by what is done with the margin.

A percentage of life, as of business, must go for running expenses; for instance, the time spent in earning a living. A percentage must go for repairs; for example, sleep and food. Then, for all, there should be some margin; to some, less; to some, more; but to all, some; some margin; something to spare; some life left over to direct as one wills and not as some one else wills; hence the speaker's topic: "What Shall We Do? or, What Do We Do With This Margin?"

In the margin the person's individuality comes in. How do you use your margin? What do you make it bring you?

The topic was thoughtful, clever, cute. When the audience rose, after the speaker concluded, the comment was in every mouth: "What a sensible, clever, cute, useful address!"—J. A. WALKER.

AUTOMOBILE AND CARRIAGE SPRINGS.

How to Prevent Rusting, Squeaking and Liability to Breakage.

We have lately seen and examined some broken automobile springs. The rusted condition of the metal showed just where the fault laid. The leaves of the springs, where they came in contact one with the other, had not been properly painted.

If the leaves of automobile or carriage springs are painted with Dixon's Silica-Graphite Paint or with a mixture of linseed oil and flake graphite, the springs will never squeal; they will ride much smoother and, probably, will never break.

The flake graphite thoroughly coats and lubricates the metal, enabling the leaves to slide one over the other with ease as they are intended. This assures smoother riding qualities, freedom from squeak, protection from rust and wear, and reduces liability to breakage to the minimum point.

Carriage builders, like the Studebaker Bros. Mfg. Co., have for many years fully appreciated the value of Dixon's Flake Graphite for the protection of carriage springs.

Dixon's graphite publications are sent free of charge to all who are interested in the subject of graphite.

SHOPPING THE LOCOMOTIVE.

At a recent meeting of the Pacific Coast Railroad Club, Mr. F. P. Roesch presented an interesting paper on railroad management, in the latter part of which he discussed the question of locomotive maintenance; in part he said:

"This is a large item of expense; locomotives to be economical should be maintained as nearly as possible in condition to handle their full tonnage rating. The loss in freight handled, to say nothing of delays, etc., would be far in excess (if locomotives are not in first-class condition) of what the cost of putting the engine in good condition would have been. The locomotive that is not capable of taking a train over the road without 'falling down, setting out or dying,' should be left in the roundhouse until put in good condition, as it is simply a dead loss to try to keep it in commission.

"The average cost of overhauling is about \$1,500. The earning capacity of a locomotive is about \$200 to \$600 per day."

The locomotive engineers of the country some years ago began to use Dixon's Pure Flake Graphite as an emergency preparation when bearings ran hot and cylinders and valves labored and groaned. They have gradually come to believe Dixon's Graphite as a never-failing cure for friction troubles. By its use they are enabled to make record runs, pull the heaviest trains and to avoid delays and breakdowns, cut brasses and pins, scored cylinders and worn valves and all the other results of imperfect lubrication that take their locomotives off the road and put them into the shop.

Master mechanics and superintendents have long since learned that an ounce of prevention is worth many pounds of cure, and that a little flake graphite used on pins and eccentric straps in cylinders, valves and air pumps, will save hundreds of dollars worth of repairs and keep the locomotives in the best condition on the road, where they are needed and where they are valuable.

SEPARATING GRAPHITE FROM EXHAUST STEAM.

One of the questions which very frequently come up with those who are beginning to use graphite as a lubricant, is how to separate it from exhaust steam. The answer to this is absolutely simple. Any separator or grease extractor or filter that will remove cylinder oil from exhaust steam will remove every trace of graphite.

Suppose, however, on shipboard that the graphite gets into the condenser and coats the tubes a little. We have been informed by a marine engineer of great experience that the action of graphite in a surface condenser is to greatly reduce the electrolytic corrosion of the tubes. He told us of one instance where this was brought very strongly to his notice on a ship where graphite has been used as a regular cylinder lubricant. The exhaust steam discharged into the top of the condenser so that the tubes were slightly coated with it on their upper sides. Some months later, when it became necessary to open and examine the condenser, it was found that the under sides of the brass tubes where almost no graphite had been deposited, were very badly corroded, while the upper sides seemed to be in perfectly good condition.

There is still another point in this connection, and that is, if graphite gets into a boiler it will be found that it will make the boiler scale much more friable and less tenacious.

Only a little graphite is necessary in steam cylinders to give excellent results, and there need be no fear of there being any secondary evil results if ordinary good practice is followed in the management of the steam plant.

DIXON'S GRAPHITE GREASE No. 8815.

This grease possesses a remarkable degree of resistance to heat although its consistency is such that even at ordinary temperatures it will feed readily through a compression grease cup. It is particularly valuable for lubricating bearings, spindles, cams, etc., of gas engines, where the heat radiating from the cylinders liquifies ordinary greases so rapidly that they melt and run off without doing useful work.

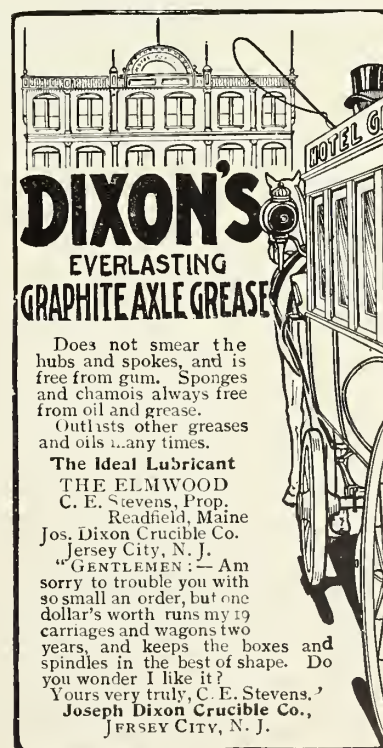
"GRAPHITE AFLOAT AND AFIELD."

A New Dixon Booklet.

A new booklet has just been issued by the Advertising Department of the Dixon Company, called "Graphite Afloat and Afield," which aims to put before those interested in yachting particularly, in an attractive form, the several productions which will prove of especial value upon the different classes of yachts and boats.

The problems encountered in the steam yacht or even in the motor boat, are the same which confront the operator or engineer of the enormous engines of our liners, although in a much lesser degree. Nevertheless, Dixon's Pure Flake Graphite, Dixon's Graphite Cup Greases and Waterproof Grease, Dixon's Silica-Graphite Paint and Graphite Pipe-Joint Compound are very useful upon the power launch, as they are upon the ocean greyhound.

A copy of this booklet will be freely sent to all who are interested in boating or shooting, for graphite serves a valuable purpose to the sportsman and yachtsman.



DIXON'S
EVERLASTING
GRAPHITE AXLE GREASE

Does not smear the hubs and spokes, and is free from gum. Sponges and chamois always free from oil and grease. Outlasts other greases and oils many times.

The Ideal Lubricant
THE ELMWOOD
C. E. Stevens, Prop.
Readfield, Maine
Jos. Dixon Crucible Co.
Jersey City, N. J.

"GENTLEMEN:—Am sorry to trouble you with so small an order, but one dollar's worth runs my 19 carriages and wagons two years, and keeps the boxes and spindles in the best of shape. Do you wonder I like it?"
Yours very truly, C. E. Stevens,
Joseph Dixon Crucible Co.,
JERSEY CITY, N. J.

OUR LONDON PAGE

All Communications, Inquiries, Etc., relating to this Page should be addressed to Joseph Dixon Crucible Co. (Geo. W. Wollaston, Mgr.), 26 Victoria St., S. W., London.

Don't let Trouble

come before you call in the aid of graphite. Test it **now**. No grease is so good as a **graphite** grease. Oils alone are not satisfactory in many respects. Graphite does not eliminate oil entirely, but reduces its use to a minimum.

SAMPLES FREE.

JOSEPH DIXON
CRUCIBLE CO.,

26, Victoria St.,
LONDON, S.W.

TALLY-HO!

The following letter is unique of its kind, and is certainly uncorrupted testimony to the merits of Dixon's Graphite and Pipe-Joint Compound. We do not think Mr. Fox, who writes as one would expect of a rollicking old huntsman, will object to our inserting his interesting letter verbatim:

BECKENHAM LAUNDRY, KENT, May 4, 1904.

As per advertisement,

Mechanical World, current issue.

Dear Sirs,

I shall be very much obliged if you would kindly let me have the little booklet & sample of your graphite for lubricating bearings.

Some 2 years ago I had a small quantity of your graphite given me. I had only then just left the huntsman's saddle, hung up the hunting horn, put the spurs on the back of the kitchen door and used the hunting whip to drive the cats off the garden, & after 30 years in the saddle (in fact, since a small kid) I bought a steam laundry and begun to learn something about machine bearings & their vagaries, such as getting hot, jamming tight, squeaking & in some cases disappearing altogether despite oil, asbestoline, mutton fat, soft soap and cold swabs. Then your graphite. I use it when I have it mixed with mutton fat, asbestoline and dry, & have learnt a thing or two both with gas engines & steam, high-speed fans, heavy bearings of callendars & my van & cart axles. I have mixed it & given it to neighbours for the spindles of hydros of 2,000 P. min. R. & they think it is real top sawyer stuff. Now I want to give it an extended trial & will let you know what machines I use it on. It ain't a lame horse, I know.

Is that your stuff I bought in Thames Street for steam pipe jointing? If so, I use it for coating Jenkins 96 washers, for flange unions, all bolts, nuts and pipe joints doing up the connections of injectors, painting over asbestos rings of mud & manholes of steam boilers, & have not yet had *one joint* blow & have turned steam in directly joint was made.

One old plumber & steam pipe fitter said: "Dammed if I like that new fashioned stuff, give me red lead!" One

week after he was coasting round & begging for a bit, as he had found it the best stuff ever he had used & still uses it—what ho!

Manager of the works of a big Manufacturing Company did not believe in it for his Plant—then try a bit—three weeks after he sent the following letter to my place: "Quick, let's know name of stuff—black-looking stuff—you gave me t'other day; where can I get it? local iron-mongers don't keep it." (They have to keep it now or lose this firm's custom!) And yet the bally old huntsman has to show mechanics, engineers, etc. the good things of their own trade. What think of it? I read, mark, learn and *try* when I see a maker says his things are good.

This black stuff I get in 7-lb. tin. Dixon's Jointing Putty, I think, is on the tin—red label like my old hunting coats. Don't you see, Mr. Graphite Dixon, I don't want people coming & calling me names and putting their fingers to their noses saying, You don't know the good things in their steam and water pipe line. When threads are clean, I don't use hemp or tow, but just paint a little on threads & joint up right away. It may be rude & spit at you for a moment, but quality tells & good behavior shows itself, as the joint is soon as silent as a mouse when a hungry cat is sniffing around, & like the Sea Serpent we know it's there but it don't show itself werry often, yet it keeps. steam, water and gas where you expect it to be & don't let it play at fountains through the joints.

Don't you believe all I have written about it? If you don't, you never ought to be able to sell or make another bit. And that Sir is from

CHARLES FOX,
The Champion Clear Starcher.

Just a little N. B.

Trouble with gear & hot bearings of collar & shirt ironing machines, with hot Bunser burners, heated gas spray jet running right through centre of roller running at 300 revolutions & grease, asbestoline & other makes splashing & spluttering all over beautiful clean white shirts and collars—operators crying, Missus doing something worse—engineer tearing his hair off, so as it shan't turn grey—when presto, half a mo!—little dry Graphite, no more fright, everything all right, things nice & white, bearings clean and bright, little blacky white, not so black as might, but—*right*! Fact! Good-night!

SLIP.—A Frenchman once told an American that there were 49 ways of cooking eggs, but 99 ways would hardly cook the Dixon Graphite Compound.

Emergency Recipe for Leakage in Composition Pipe.

By the Pipe Doctor, C. Fox.

Ingredients.—Strip of old calico or linen.

Dollop of Dixon's Pipe Putty.

How to apply.—Spread Dixon's Putty on rag; bind tight with twine round leak; then go about your other business. Don't worry.

Graphite

VOL. VI.

SEPTEMBER, 1904.

No. 10.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

COPY FREE ON REQUEST.

COPYRIGHTED BY THE JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J., U. S. A.

PAINT TEST AT COPENHAGEN, DENMARK.

Attest fra Statsproveanstalten i Kjøbenhavn viser Resultaterne af Forsøg foretagne med Dixons Silica Grafit, Blymonnie- og Skælpanser-Farve, der alle vare udsatte for Paavirkning af Røg og Gas ved en Temperatur af ca. 200°.

Dixons Silica Grafitfarve viste sig at være absolut den bedste og de andre Farver langt overlegen, idet den først blev angrebet efter 60 Dogn (Monnie efter 7 Dogn) og først blev odelagt efter 150 Dogn (Monnie efter 17 Dogn). Altså er Dixons Silica Grafitfarve den bedste Farve til Jernkonstruktioner, der ere udsatte for Røg og Gas-Arter's Paa-virkning.—GUSTAV HALBERSTADT, København K. Telegr.-Adresse: Regulator. Telefon No. 1004.

TRANSLATION.

Certificate from the Government Test Station at Copenhagen shows the result of experiments made with Dixon's Silica-Graphite, white lead and armor-plate paints, all of which have been exposed to the influence of smoke gases at a temperature of about 200 degrees.

Dixon's Silica-Graphite Paint turned out to be absolutely the best and much superior to the other paint, being affected only after sixty days' exposure (lead after seven days) and totally destroyed after an exposure of one hundred and fifty days (lead after seventeen days).

Therefore Dixon's Silica-Graphite Paint is the best paint for iron constructions which are exposed to the influence of smoke and gases.

Mr. Gustav Halberstadt of Copenhagen, Denmark, is an enthusiastic, active agent for Dixon's Silica-Graphite Paint in Denmark. Mr. Halberstadt uses the mails very extensively to distribute blotters, books and cards of attractive designs in colors, telling in the Danish language of the rust preventive qualities of Dixon's Silica-Graphite Paint.

Springfield, Mass., Oct. 19, 1903.

The 'Eterno' pencil is the best copying pencil I have ever used. The copy is much better than ink.

F. B. Bickley.



ST. REGIS HOTEL, NEW YORK CITY.

TROWBRIDGE & LIVINGSTON, Architects.

THOMPSON-STARRETT CO., Contractors.

MARC EIDLITZ & SON, Contractors.

The new St. Regis Hotel, corner Fifth avenue and Fifty-fifth street, located in the very heart of the fashionable residence section, is a marvel of scientific construction and artistic decoration.

Erected at a cost of \$5,000,000, it establishes a new standard of luxury in hotel life. Trowbridge & Livingston, the architects, have furnished Col. John Jacob Astor, the owner, with the grandest palace the world has ever seen.

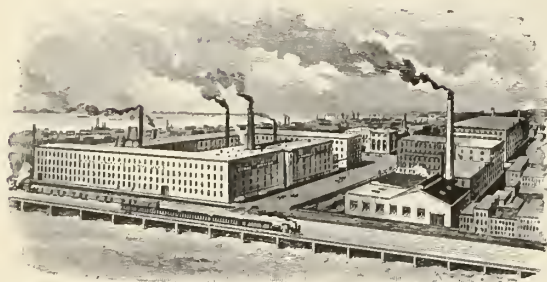
It would require many pages to describe the excellent architectural and mechanical features of this hotel. The June issues of *Architecture* and the *Architectural Record*, New York City, contain complete descriptions and remarkably fine illustrations. A \$2,000,000 addition to the St. Regis is now being built on the Fifty-fifth street side.

Dixon's Silica-Graphite Paint was used to preserve the structural steel work of the St. Regis Hotel, and the new addition.

ESTABLISHED 1827.



INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

BRANCHES AT

68 Reade St., New-York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Pittsburg, Paris, Hamburg, Vienna,
Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen,
Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., September, 1904.

AN ACTIVE DEPARTMENT.

The Paint Department appropriates the columns of GRAPHITE this month with seasonable talk on the preservation of metal surfaces with Dixon's Silica-Graphite Paint.

Thirty thousand copies of this issue will be distributed to paint specifiers and users in every country in the world. We will appreciate your filing this copy for future reference or the passing of it to a friend who may be interested in the use of a "high grade" protective paint.

We give careful attention to letters of inquiry as to the adaptability of Dixon's Silica-Graphite Paint for different classes of metal and wood construction.

WORLD STATISTICS.

At a rough calculation the population of the world is more than one billion souls. These speak some 3,064 languages, and are worshippers of more than 1,100 religions. The average length of life is 33 1-3 years. One-fourth of mankind die before the seventh and one-half before the seventeenth year. Only one-sixth live beyond the age of sixty. Thirty-three millions die annually, 91,000 daily, 3,730 every hour, 60 per minute. While one-fourth are capable of bearing arms, only one in a thousand is naturally inclined to the profession.—*New York Herald.*

Dixon's graphite publications are sent free of charge to all who are interested in the subject of graphite.

QUALITIES OF THE FUTURE SALESMAN.

We quote the following from the sayings of the Minneapolis City Salesmen Association:

"The salesman of the coming ten years will differ from the salesman of the past in sobriety and great capacity for work, physical endurance and keeping everlastingly at it."

"The salesman will find future conditions more demanding than those in the past."

"The whole solution of the salesman problem in the future lies in the word 'work.'"

"Today there are too many men who are doing other things when they ought to be selling goods. Where we find one man who will work hard and will do everything in his power to make the best of his possibilities, we find nine who fail to come up to this standard."

"Many salesmen of today fail to remember that the expense of doing business runs so dangerously near profit and loss as to make many business ventures decidedly uncertain. Under present conditions it is causing the manufacturer and the wholesaler too much to sell the goods. On the one side, profits are cut down through the operation of combinations; on the other side, expenses are higher than ever. There will come an end to this sometime. Such conditions breed revolutionary changes. The problem before the wholesaler and the manufacturer is to sell the goods at the lowest possible expense. In getting the volume of business the old-type traveling salesman is not valuable."

"Give me a man who will keep everlastingly at it, in preference to the genius who makes some bright flashes and retires on his laurels for several days' rest."



BOAT HOUSE.

United States Naval Academy, Annapolis, Md.

The Government is spending millions of dollars on new buildings and improvements, at the United States Naval Academy, Annapolis, Md.

The design and construction of the magnificent buildings are under the direction of Mr. Ernest Flagg, an eminent architect of New York City.

Dixon's Silica-Graphite Paint was selected for preservation of steel work of the new Boat House, the new Marine Engineering Building and the new Cadets' Quarters.



APARTMENT DWELLING, NEW YORK CITY.

Horgan & Slattery, Architects.

The apartment dwelling on the southeast corner of 61st Street and Madison Avenue, New York City, is a model of architecture, construction, arrangement, decoration and equipment. It occupies a lot 110 ft. square, in one of the most exclusive and conservative residence districts of the city.

The design of the building is Modern French Renaissance, and the elevations are faced with Indiana limestone from the sidewalk to the roof. The construction is of the skeleton-steel type, thoroughly fireproof, with columns resting on steel caissons on solid rock, which is found 50 ft. below the surfaces. The main entrance is on Madison Avenue, and the porte-cochère extends under the building

into the first story. The building proper rises ten stories in height above the curb line, with a basement, and roof house for servants.

There are but two apartments on each floor, each comprising a drawing room, library, dining room, reception room, four bed chambers and three bathrooms; also two servant's bedrooms, a bathroom for servants, kitchen, serving pantry and butler's pantry. In addition to these, there are numerous closets, storerooms and wardrobes. The price of the apartments, unfurnished, are from \$6,500 to \$8,500 a year. The building was designed and erected for Mr. Frederick Haberman. The steel work was started October 7, 1900; the building was completed and occupied October 1, 1901; the cost was \$1,230,000.—

It is interesting to observe that in the selection of the very best class of building material for this magnificent apartment dwelling, Messrs. Horgan & Slattery, architects, provided for the use of Dixon's Silica-Graphite Paint for all structural steel work.

NEGLECTED ROOFS.

"Out of sight, out of mind," is strikingly true of that portion of the building which protects us from the storms, heat of the day and dampness of the night.

Roofs are usually large flat surfaces, which by reason of their full exposure to the elements, bear the very hardest portion of the fight against decay.

Each spring and fall roofs should be carefully examined by a reliable roofer to ascertain the need of repairs. The repair bill can be kept down to a minimum and the necessity of a new roof obviated by the semi-annual inspection. The practical roofer will recommend the soldering of broken seams, the sweeping off of dirt and cinder accumulations (rust producers), and the touching up of broken points in the paint coating with Dixon's Silica-Graphite Paint. An evenly applied coat of Dixon's Silica-Graphite Paint every three years, is roof economy.

Dixon's graphite publications sent upon request.



WABASH RAILROAD TERMINAL, PITTSBURGH, PA.

Theodore C. Link, Architect.

Geo. A. Fuller Company, Builders.

Pennsylvania Steel Co., Steel Contractors.

Structural Steel Protected With Dixon's Silica-Graphite Paint.

PAINT FOR MILLS.

Mill owners fully appreciate the desirability of having their buildings present a well-kept appearance, but their chief difficulty has been to secure a paint that would not blister and crack in a season or two.

To preserve and beautify structural iron, metal surfaces and smoke-stacks, a paint must be used which will not be destroyed by continued exposure to the rust-forming elements, heat of the sun and rain.

The expense and annoyance of frequent repainting can be avoided by the use of a coating of flake graphite and silica for pigments, and boiled linseed oil for a binder, and a product of this nature is made under the trade name

of Dixon's Silica-Graphite Paint.

This product has certain economical features over the ordinary paints, in that the flake graphite is a lubricant, and in its use as a pigment the paint is brushed on with great ease, saving materially in cost of labor and brushes, and gives a covering power of 500 to 600 square feet to the gallon for a good coating. Dixon's Colors have given a service of seven years on the iron covered elevator building of the Kentucky Public Elevator Co., Louisville, Ky., eleven years' protection without repainting on the one mile, four track wide steel elevated structure of the Pennsylvania Railroad Co., Jersey City, N. J., and five years on the 150 feet steel smoke-stack of the Columbus-Edison Electric Light Co., Columbus, Ohio.

A practical little folder entitled, "Colors and Specifications," illustrated with five different types of steel construction, and containing suggestions for construction and maintenance painting, with the four colors of Dixon's Silica-Graphite Paint, can be secured by addressing the Joseph Dixon Crucible Co., Jersey City, N. J.

Franklin, N. H.,

Oct. 15, 1903.

The Dixon 'Eterno' pencil which you sent me free for trial I find the best that I have ever used.

Thanking you for the above, I remain,

Herbert J. French.

Ware, Mass., Oct 16, 1903.

When I write I want to leave a mark that is instantly black and permanent. I rarely use a pencil, except when away from my desk, as I have found no pencils that meet my requirements fully, but I think I shall enjoy using your Dixon's 'Eterno' No. 2050, as it is black and permanent and withal writes as easily as my favorite pen. It is far better than the best writing and copying pencils I found up to this time. I shall ask our local dealers to carry it in stock.

(Rev.) O. J. Fairfield.

THE NORTH GERMAN LLOYD TERMINAL.

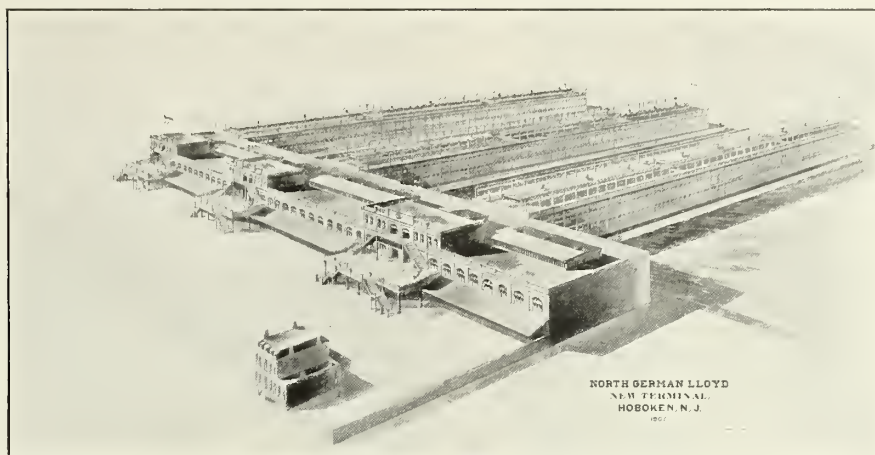
The North German Lloyd Steamship Co. are now occupying their piers 1 and 2 and the bulkhead building that have been in course of erection since the great steamship fire of June, 1900.

The North German Lloyd Terminal, Hoboken, N. J., was designed by Captain W. F. Whittemore, an engineer of wide experience in pier building and general waterfront

ing it impossible for them to buckle if exposed to fire.

A feature and one that will become popular is the Promenade Roof, entrance to which is by stairways at the Pediment Stories from the galleries and also by six electric elevators within the building. One can walk for 900 ft. and look down upon the great liners as they warp into or depart from their berths.

We illustrate a bird's-eye view of the terminal and the

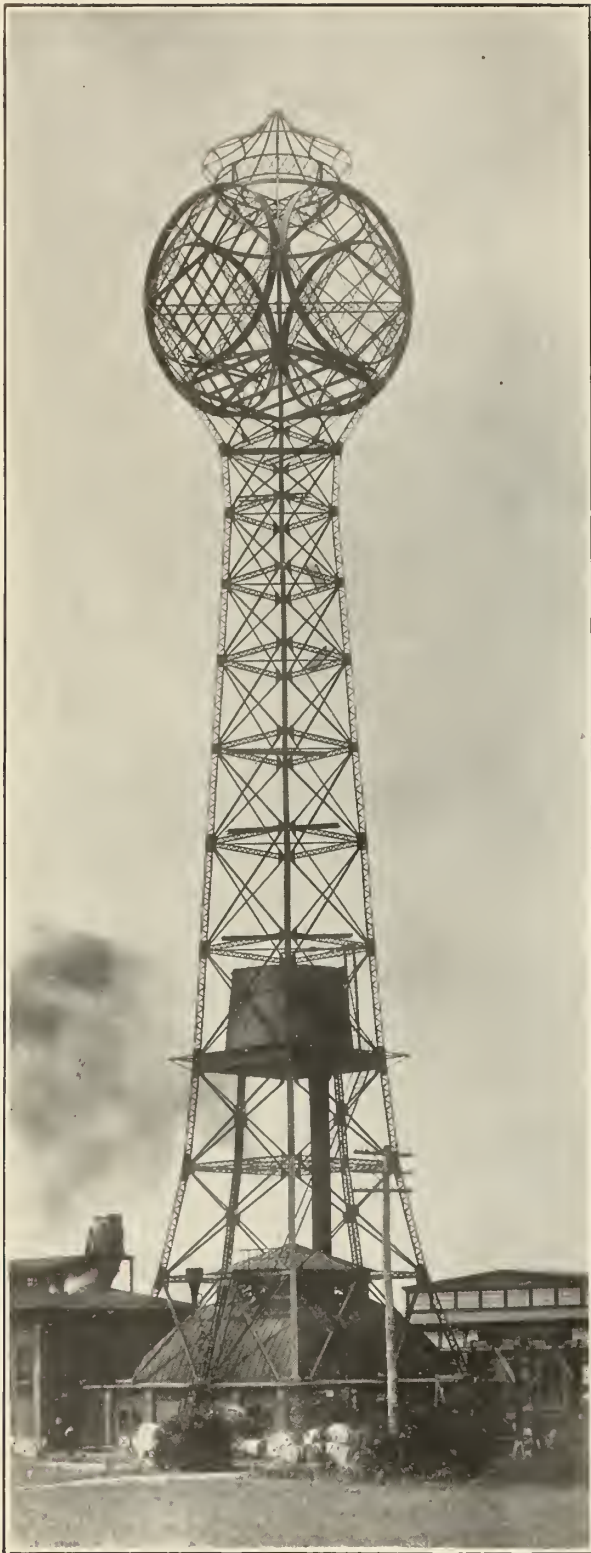


improvements. The piers are 80 to 90 ft. wide and 870 to 900 ft. long; the foundation being piles of heaviest construction, driven to an average of 75 ft. below high water.

The ingenuity and originality of the designer are displayed at all points in the safeguards against fire from within and ships lying alongside. The columns are filled with concrete and surrounded by a thick layer of the same material, the whole being protected by a steel jacket, mak-

ing it impossible for them to buckle if exposed to fire. In the construction of this great terminal, Dixon's Silica-Graphite Paint, Natural Color, was used for all structural steel work, column jackets and doors. At the present time, Dixon's Silica-Graphite Paint, Dark Red, is being applied to all exterior iron work by Stelling & Breitenstein, painters, under the direction of Captain M. Moller, Inspector of the North German Lloyd Terminal.





ENGINE HOUSE, CLOCK AND TANK TOWER,
John Stephenson Company, Elizabeth, N. J.

It would require a good-sized book to describe, and in fact one has been written by Chas. Henry Davis, C. E., on the location, design and construction of the great industrial establishment of the John Stephenson Company, Car Builders, at Elizabeth, N. J.

The property contains 117 acres, and is improved with shops of the finest and most modern construction. Special attention was given to the economical handling of parts of the car in construction and for shipment of the finished cars.

Passengers on trains of the different trunk lines entering Jersey City and on trolley cars, have wondered and inquired as to the tall steel tower that can be seen for miles from many parts of New Jersey.

The illustration accompanying this article will tell that it is the clock and tank tower of the John Stephenson Company, Car Builders. The tower is designed to support a clock and 3500 lb. copper bell and frames for same weighing 36,000 lbs. total, at a height of 200 ft. above the base, and a sprinkler tank at 70 ft. above ground, weighing 240,000 lbs. A wind pressure of 35 lb. per sq. ft. was allowed at the floor of the clock. The base of the tower is 52 ft. square, tapering by a gentle concave curve on each leg, to 24 ft. square, 70 ft. up, where the sprinkler tank is located, thence 104 ft. more, narrowing to 14 ft. square, 174 ft. above the floor. From here by reverse curves, the four legs run up to the edges of the clock faces 25 ft. up, being 25 ft. square, and at clock edges, 17 ft. higher, 35 ft. square. From floor to top of clock roof is 275 ft. The total weight of the steel frame work is approximately 200,000 lbs.

It will interest the readers of GRAPHITE to know that this tower is painted with Dixon's Silica-Graphite Paint, Dark Red, for its protection and the effect. This paint is manufactured in four durable and pleasing colors for steel work — Olive Green, Natural or Graphite Gray, Dark Red and Black.

WHAT CAN YOU DO?

The Following is Part of an Editorial in "The Journalist," and what Is Said of All-round Journalism May Be Equally Said of Almost Any Profession or Business.

The simple truth remains that natural aptitude directs every successful man's career on earth. All-around journalism is dying out fast. To know one branch of your profession, and that thoroughly, is now the great thing. I am firmly of the belief that the time is not very far off when the city editor will be asking the young man who is seeking employment not, what college did you come out of, but what can you do and what is your special sphere of usefulness? For a fire reporter, a study of the fire department in all its details must naturally be more useful than any other, while the closer the man who has to cover police can get to being a Sherlock Holmes the more substantial value he is to his paper.

The very meaning of the word education is the taking out of persons that which they already possess, but which is lying dormant. The boy who follows the machine may be, and very often is, the fireman of the future, but how many youngster's journalistic ambitions die out with the college or high school paper?

I am rather surprised to see that Mr. Pulitzer thinks so little of the business office. Without the business office where would his papers be to-day, or any other papers, for the matter of that?

SHARP (of the firm of Sharp & Jenkins)—"Why did you countermand your order for those fountain pens?"

JENKINS—"The agent took down my order with a Dixon Eterno pencil."



THE ST. JAMES APARTMENTS.

The handsomest of their kind in Philadelphia, Pa., are located on the S. E. Corner 13th and Walnut Streets.

The structure was designed by Architect Horace Trumbauer, of Philadelphia, and shows a 14-story main building, together with a 7-story addition.

Buff brick, Indiana limestone and terra cotta are the materials used for the exterior construction, while the interior is trimmed with curly birch and handsomely decorated throughout.

The building provides for 85 apartments with private baths attached. Every modern appointment has been installed to make the structure the most complete of its kind in the world.

The structural iron work of this magnificent building is preserved with two coats of Dixon's Silica-Graphite Paint.

THE BOSS AND HIS HELPER.

The factory is run to make money.

The stockholders stand at the door and say, "Dividends." The Manager struggles for good prices so expenses can be made, with a margin over; something for the stockholder and something for the surplus, to tide over possible poor years, possible disaster. But this is not all of it. If this were all, the enthusiasm would soon spend and the retrogression commence.

Above surplus, above dividends, above all other considerations, should be two dominant motives. First, to make the best goods of his kind and, second, to make them at the lowest possible cost of production and at the same time

pay good wages. The lower cost of production should not come out of the wage earner, but should come from better machines—better managed, up-to-date machines, run by well-paid, up-to-date workmen.

As with the Boss, so should these two dominant motives prevail with his people—to produce the best goods, the best of their kind and at the lowest possible cost of production. This means the best management possible on the part of the Boss and a high degree of co-operation on the part of his helpers.

No machine should live if another—a new one—could do more or better work. No hand labor should prevail if a machine can be devised to take its place, and no machine should be run and no one allowed to run it, who could not extract from his machine its biggest and best daily output.

—J. A. WALKER.

FACTORY TIPS.

President Elliot of Harvard says, "A man ought not to be employed at a task which a machine can be made to perform."

In the same vein the *Michigan Tradesman* says, "Every business plant has been made more profitable by the substitution of accurate, automatic machinery for hand labor and this not only, but later by the replacing of old machinery by improved machinery."

Again in the same line, the Cash Register people write that for inventions and for patents to protect the result, they spend about \$90,000 a year.

A slight variation of the same theme was expressed by the Manager of one of our large industries; to wit, they wished only such workmen as are fit for and on the lookout for promotion. This rule with them, he adds, is invariable.

The upshot seems to be that nothing in factory work is done right until it is done well, as quickly and as cheaply as the best equipped man with the best equipped machine can do it, until the maximum of work is turned out at the least cost and with the least waste.

—J. A. WALKER.

DIFFERENT RESULTS FROM AN APPLE.

Mr. Kerr of the Westinghouse-Church-Kerr Company, addressing the Stevens Institute Graduating Class, said he believed the name of Adam, our traditional first parent, and Sir Isaac Newton were connected with an apple, but with marvellously different results.—J. A. WALKER.

THE CIRCLE.

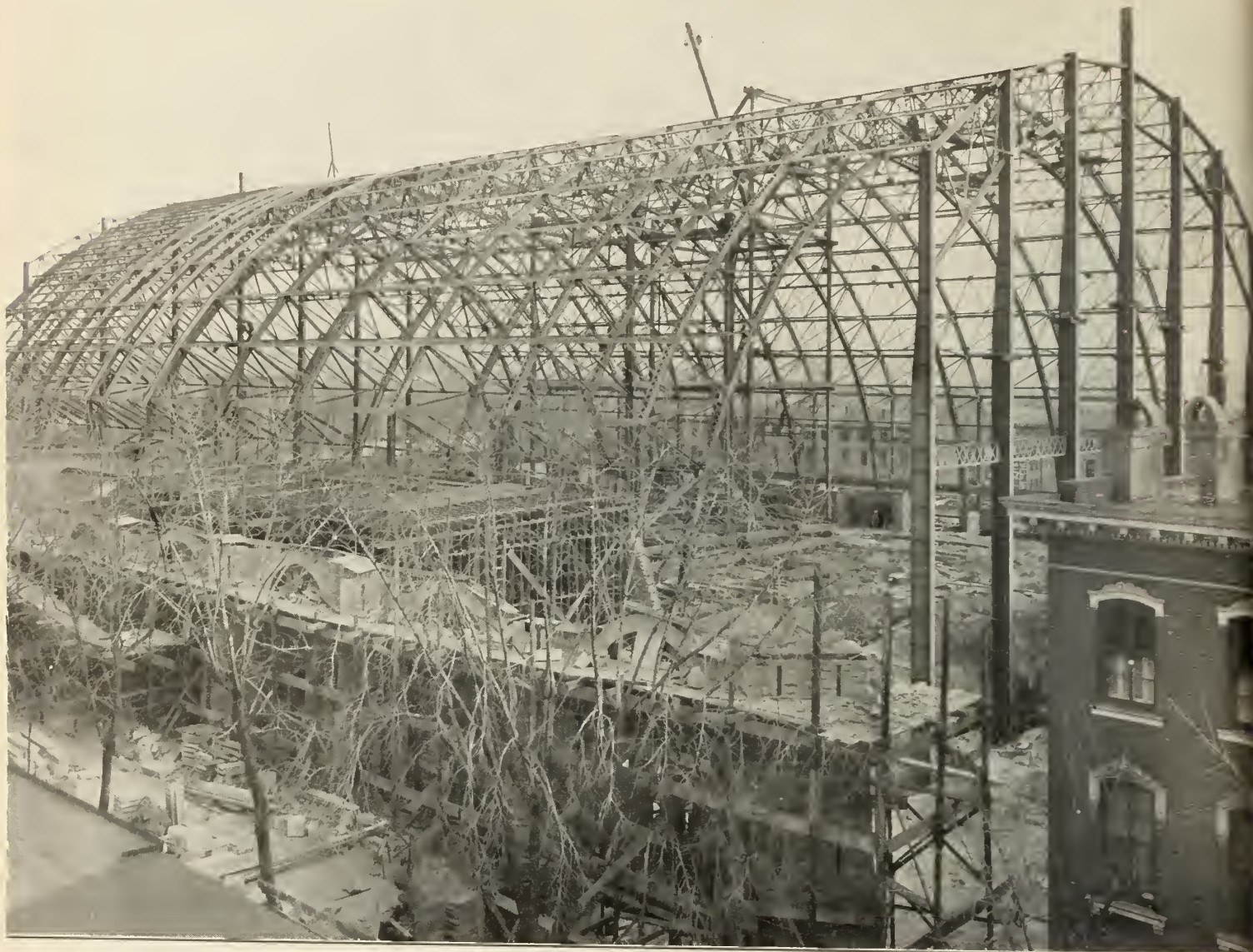
"In youth we dream that life is a straight line; later we know it to be a circle in which the present presses on the future, the future on the past."

—KATHERINE CECIL THURSTON.

'Wilmington, Del., Oct. 24, 1903.

'Dixon's 'Eterno' sample pencil received and we find it gives excellent results in copying letters, etc.'

Wm. Lomb.



**THE FIFTH REGIMENT ARMORY BUILDING,
BALTIMORE, MD.**

Showing Roof Trusses and Main Columns During Erection.

The Fifth Regiment Armory Building, Baltimore, Md., is one of the largest structures in that city. Situated on Hoffman street, it occupies a site measuring 354 x 284 feet. The cost of the building was approximately \$425,000.

A feature of the building is the drill-hall roof, the framework of which is made entirely of medium steel, excepting the lattice bars, rivets and lateral rods, which are of soft steel—all conforming to the standard specifications of the American Association of Steel Manufacturers. This roof covers an unobstructed floor area of about 199 feet wide and 293 feet long in the clear.

The structural steel and iron work of this massive building is protected with Dixon's Silica-Graphite Paint. It was required that the second coat of paint should be applied not less than ten days and not more than thirty days after the field coat.

Messrs. Wyatt & Nolting, Baltimore, were the architects of the building. The same firm of architects also designed the new Court House at Baltimore—one of the handsomest

in the country; the American National Bank, Richmond, Va.; and the Post Office Building at Norfolk, Va.

The structural work was erected by the American Bridge Co., under the direction of Mr. Paul L. Wolfel, Chief Engineer. Messrs. R. C. Sandlass and T. M. Kellogg were the consulting engineers, and E. M. Noel the general contractor.

PROTECT AGAINST THE STORMS OF WINTER.

The early fall is the season best suited for the application of paint to steel and metal surfaces.

Specifiers and users of preservative paint should have a copy of "Colors and Specifications," which is published for free distribution by this Company.

Sewaren, N. J., Oct. 15, 1903.

The sample of your 'Eterno' copying pencil received, and beg to say that it appears to fill the requirements of a first-class copying pencil.

T. F. Zettlemayer, P. M.

Dixon's graphite publications are sent free of charge to all who are interested in the subject of graphite.



TRINITY BUILDING.

Broadway, Adjoining Trinity Church, New York City.

FRANCIS H. KIMBALL, Architect.

S. C. WEISKOPF, Engineer.

GEO. A. FULLER Co., Builders.

The Structural Steel Work Now in Course of Erection Is Being Painted for Protection With Dixon's Silica-Graphite Paint, Dark Red and Natural Colors.

HARDWARE AND PAINT DEALERS.

Good sellers are to be found in the four colors of Dixon's Silica-Graphite Paint. Place your orders with us early, so that the fall painting season will find you ready to make prompt deliveries. Let us help your sales department with our personal letters to local concerns (names that you are requested to send us), mentioning that you carry Dixon's Silica-Graphite Paint in stock, and give prompt attention to inquiries and orders. Your talks, our personal letters and illustrated cards, with the merits of Dixon's

Silica-Graphite Paint, will win many good orders for you this fall.

We suggest special attention to securing Dixon Paint orders from officials in charge of town and county bridges; owners of manufacturing plants for steel smoke-stacks, roofs and iron work; colleges, churches and cemetery associations for ornamental iron fence protection; warehouse owners for corrugated iron work and shutters; and other lines of trade that are peculiar to your district.

Dixon's Silica-Graphite Paint makes a satisfied customer for your other products.



THE LAFAYETTE HOTEL, BUFFALO, N. Y.

Bethune, Bethune & Fuchs, Architects.

The new Lafayette Hotel was opened for the reception of guests June 1, 1904. The main entrance to the hotel faces Lafayette Square, the carriage entrance being on Washington Street, and leading directly to the Women's Reception Room and the three restaurants.

The location of the new hotel is the finest in Buffalo, as it fronts on Lafayette Square, with its Soldiers' Monument guarded by cannon and surrounded by flowers, and beyond the fine Public Library. The Transportation Club, of Buffalo, occupy the greater part of the sixth floor, and its rooms are models of comfort and harmonious decoration.

The exterior of the hotel in French Renaissance architecture, reflects highly to the credit of Bethune, Bethune & Fuchs, and they have been particularly successful in the artistic arrangement and decoration of the interior. Every wall decoration was selected to harmonize with the carpet, and the results suggest the taste of a private house. Throughout the hotel there are everywhere found the latest devices for adding to the comfort of guests.

The lobby is finished in Numidian marble and mahogany; the restaurant facing Washington Street, in a most artistic blending of brown and green, relieved by decorations in green and gold; the grill room on the Clinton Street side of the house in oak and Welsh tiling, with the walls above the wainscoting panelled in leather on which are painted scenes from 'The Merry Wives of Windsor.' The second floor is the banqueting room in soft tones and quaint carv-

ings of old ivory, and the Women's Parlor is dainty in silver and violet.

The cost of this new hotel was \$1,000,000. The Buffalo Structural Steel Co., who supplied and erected the steel work of the Hotel Lafayette, carefully followed the specifications and instructions of Messrs. Bethune, Bethune & Fuchs, architects, in the use of two coats of Dixon's Silica-Graphite Paint for all steel surfaces.

A. D. 2000.

Give me a spoon of oleo, ma,
And the sodium alkali,
For I'm going to make a pie, mamma;
I'm going to make a pie.
For John will be hungry and tired, ma,
And his tissues will decompose;
So give me a gramme of phosphate,
And the carbon and cellulose.
Now give me a chunk of caseine, ma.
To shorten the thermic fat,
And give me the oxygen bottle, ma,
And look at the thermostat.
And if the electric oven is cold.
Just turn it on half an ohm,
For I want to have the supper ready
As soon as John comes home.—Anon.

"You raise fine horses in the blue grass region, I believe," said an English lady to a Kentuckian. "Yes, madam, but we raise something better there than horses." "What is that?" "Men," he replied.



HOT METAL BRIDGE, UNION RAILROAD, Pittsburgh, Pa.

This great bridge was erected in 1900 by the Carnegie Steel Co. The designer and engineer of construction was Mr. Emil Swensson of Pittsburgh. It is familiarly known as the *Hot Metal Bridge*, but its official designation is the *Rankin Bridge*.

During the winter of 1900 and 1901, two coats of Dixon's Silica-Graphite Paint were applied for the protection of the steel work.

Mr. C. E. Brown, Engineer Maintenance of Way, of the Union Railroad, had this bridge examined during July of this year, to determine the condition of Dixon's Silica-Graphite Paint, and the official report states that the paint was found to be in *very good condition*.

The conditions of service are unusually severe, due to the heat and gases from the molten metal, sulphurous fumes from shifting engines, river craft, furnaces and steel mills nearby.



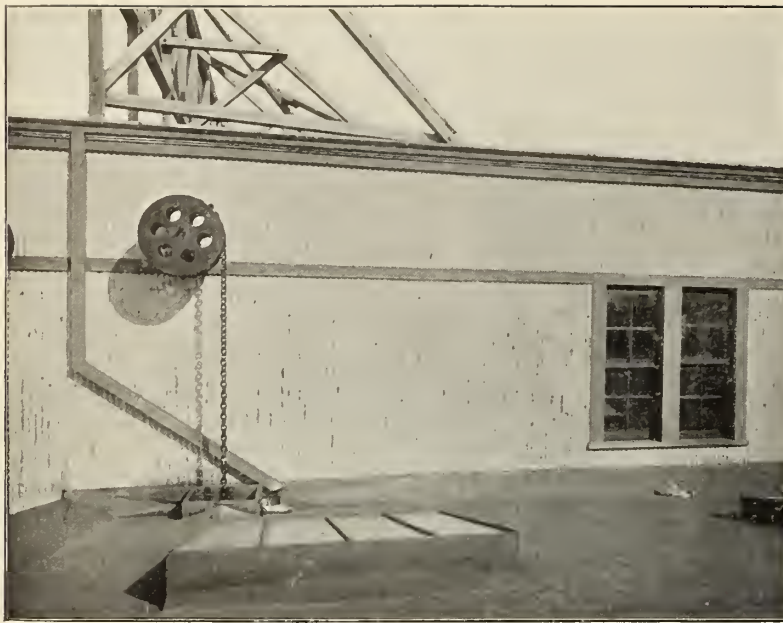
THE SUMMERS GRAVITY DUMP CAR.

Mr. E. W. Summers of Pittsburgh, Pa., has invented the most economical Gravity Dump Car of the day, with a weight capacity of 100,000 lbs., and a cubic capacity of 40 yards.

The car which is illustrated herewith, is so constructed that it will dump the load all between the rail, all outside the track on either side, or on both sides as desired. It is so built as to dump any load in any of the above positions, the operator discharging the load and closing the doors from the operating platform at the end of the car. It is not necessary to stop the train to discharge the load or close the doors. The Chief Engineer of Construction on one of the large railroad systems said recently: "These cars will save their entire cost inside of four months."

A feature of the car is the flexible arrangement of the

doors combined with rigidity of the car body, the sides of the car having ample depth with large top flange area to take care of the compression, due to vertical load, and the heavy box-like section of the lower part of the sides, combined with deep car beams, make a very rigid construction. The doors are locked and interchangeable with each other. Each door is supported on 4½ in. coil chains; the chains and shifting are protected from the lading by the double webbed floor beams, so that the doors only are exposed; the arrangement being such as to permit of rough usage and staying in service. Mr. Summers' personal experience in former years with the protective qualities of Dixon's Silica-Graphite Paint, caused him to select Dixon's Black to be applied to the above car which was exhibited at the Master Car Builders' and Master Mechanics' Convention at Saratoga Springs, June, 1904.



GALVANIZED IRON SIDES, FERRY HOUSE, NORTH RIVER, NEW YORK.
Primed With One Coat of Red Lead. Finished in White Lead. The Paint in Shreds at End of One Year's Service.



POWER PLANT, JOSEPH DIXON CRUCIBLE COMPANY.
Galvanized Iron Sides and Roof Painted with Dixon's Natural. The Paint has Adhered Perfectly for Three and a Half Years.

\$

SAVE THE COST

OF FREQUENT REPAINTING BY USING

Dixon's Silica-Graphite Paint

For Steel Work and Metal Surfaces.

JOSEPH DIXON CRUCIBLE COMPANY, JERSEY CITY, N. J.

GRAPHITE LUBRICANTS.—Publications issued by the Joseph Dixon Crucible Company always excel in elegance. That with the above title is not only no exception, but is peculiarly artistic and tasteful in design. There is a dash of warm and comforting red on the otherwise demure flexible covers and the pages within are an entertaining homily on the subject matter, historic, analytic, descriptive, etc.

—*Iron and Machinery World.*

THE COUNTRY PAPER.

Amid the pile of papers
That swamp my desk each day,
And drive me weak with clipping
And filing stuff away,
Comes once a week—on Thursday—
The quaint old four-page sheet
That's printed up in Pelham,
A drowsy county seat.

You see, 'twas up in Pelham
That first I saw the light,
And—well, my heart grows softer
And I feel my eyes shine bright;
Right reverent my touch is,
It spreads the columns wide,
The local's what I'm seeking—
The patented inside.

Ah, here it is—"The County,"
And "Jottings," "Local News;"—
You learn who's traded horses
And who have rented pews;
It tells about the schoolhouse
Where we used to sit and dream,
A-watching dust specks dancing
In the sunlight's shifty beam.

The sturdy names of boyhood
Come tumbling through our thought,
Of Tom and Brick and Patsey—
How we loved and how we fought.
The friends, when years grew graver,
Called now beyond our ken,
In the type-lines of the paper
They live and speak again.

Oh, toilers in life's workshops!
Are not those dream-mists sweet,
Which memory casts about us,
When past and present meet?
And so, I love that paper
From the village in the hills,
For the old life that it wakens,
For the weariness it stills.

—Nathaniel S. Olds in

Rochester Post-Express.

Monrovia, Cal., Oct. 29, 1903.

The 'Eterno' is all that could be desired for copying or other purposes. I sent an order today for one dozen for private use.

W. A. Taylor.

Prophetstown, Ills., Oct. 14, 1903.

Your favor received. In reply will say I think the 'Eterno' pencil super-excellent. Will send you an order in a few days.

A. T. Taylor.

OUR LONDON PAGE

All Communications, Inquiries, Etc., relating to this Page should be addressed to Joseph Dixon Crucible Co. (Geo. W. Wollaston, Mgr.), 26 Victoria St., S. W., London.

BRITISH RECORDS.

We understand that this number of GRAPHITE will be devoted almost exclusively to the Paint Question. We are writing this in London with no knowledge of the matter that will be inserted on the other pages; but no doubt some fine views will appear of important work on which our Silica-Graphite Paint has been used with the utmost satisfaction.

"They would use Dixon's!"

We started with the Paint here too recently to be able to show many similar views, as owners of structures protected with our Paint want to prove our statements as to its superior durability over all other paints, before giving us permission to make use of their names and structures. In certain cases, however, of difficult work where ordinary paints have a very short life, it is possible to decide in quicker time; and below is a letter just received by Mr. M. P. Galloway, our agent in South Scotland.

PROTECTIVE

Bow Hill Coal Co., Fife, Ltd.

Cardenden, Fife,

June 9, 1904,

It gives me the greatest pleasure to inform you that Dixon's Silica-Graphite Paint with which you have supplied us for the last three years has given utmost satisfaction, and I find it is the best for painting iron work for both above and below ground that we have ever tried.

(Signed) R. A. MUIR,
General Manager.

PAINTING.

We also append an interesting report from our agents in North Scotland, Messrs. Wm. Riddell & Co.:

"We herewith enclose order for some more Paint, etc., which we will be glad if you can ship by Saturday's steamer. We have a fair stock of all kinds except those now ordered, but we think it advisable to have some more No. 3 Red Paint on hand in view of the fact that we have at last got the Corporation Gas Engineer here to adopt

this for some of his

GAS HOLDERS,

and he may require more at any moment when weather keeps fine. The tests he made of your Paint some 2 years ago on a small holder and on iron work, where no other paint stood any length of time, have turned out so satisfactory that he decided to adopt it on a more extensive scale. We have sent him within the last 5 or 6 weeks 100 gallons No. 3, and he will probably require a further 200 gallons during the season."

We like that style of writing!

"You will also be glad to hear he is so well pleased with your Paint that he has specified it to be used for painting some large

STEEL PIPES

he is having made in Birmingham. Every week our travellers bring us in equally favourable reports as to the satisfactory results our customers have obtained by using your paint. It was at first hard work to convince many of them that it has all the merits claimed for it, but they now, without exception, readily admit we had not said one word too much in its favour. We can point to any number of

CORRUGATED IRON BUILDINGS

in our district, where to-day your Silica-Graphite Paint is as good as when put on 2 or 3 years ago.

"We are having very fine painting weather, and meantime have our usual squad of men busily employed painting."

The concluding remarks of our Aberdeen agents recall the splendid work they have done in the last two or three seasons with our Silica-Graphite Paint. They have employed a complete staff of painters, and tendered on the whole work of labour and material, and, owing to the great covering capacity and easy application of our Paint, with the consequent saving in cost of labour, have been able to outbid all of their competitors. Our representatives who have been on the spot report (with perhaps a little natural exaggeration) that "the entire district of Aberdeen is basking in the Dixon Paint Colours" applied to the many iron structures there.

N. B.—Aberdeen's a handsome-looking place!

There are still some people, we believe, who cling tenaciously to red lead and oxide paints. To such people we would say: Compare as below, and then consider which is the best—and the cheapest—paint to adopt:

| | |
|-----------------------------|-----------------------|
| Cost of labour. | } Every 2 or 3 years. |
| " " red lead and oxides. | |
| Cost of labour. | } Every 5 or 6 years. |
| " " Dixon's Graphite Paint. | |

A TRUE SILICA-GRAPHITE PAINT.

Explained by Mr. R. H. Fisher, of Dixon's Chicago Office.

In selecting a paint for the preservation of steel and other building metals, the first consideration must be the purity of the ingredients. The vehicle must be only the purest of fire-boiled linseed oil, for eventually the life of the paint will depend, to a large extent, upon the oil. The pigment must be one that will not undergo chemical change under any condition, it must assume such physical form that it may be made to protect the oil or binder, and at the same time readily shed water, also it should work easily under the brush, thus insuring a good covering capacity.

The paint formed by such materials should shed water readily at all times, and should resist such corrosive action as would be likely to occur in a building or on any exposed work.

On enclosed work, all of the paint is subjected to alkali, and in nearly all buildings the basement and first two stories are subjected to the action of such powerful corrosives as the sulphurous fumes produced by the process of combustion, which, owing to their high rate of diffusibility penetrate to every portion of these floors.

On exposed work the paint is subjected to the constant abrasive action of the elements, to alkalies and sulphurous conditions.

With the foregoing in view, we contend that Dixon's Silica-Graphite Paint fully meets all of these requirements. This graphite is a natural product mined by the Dixon Company at Ticonderoga, N. Y., and is the *only* pigment of its kind known to exist. It assumes the flake form in its physical structure and from this fact alone (if for no other reason), comes its great value as a paint pigment. There is no known solvent for this material, nor is there any chemical reaction that will affect it. Owing to our special process of milling we are enabled to obtain a particularly finely-divided product. This, together with its other properties, makes an *ideal* pigment.

The amount of silica present is controlled perfectly, and only sufficient of the material is added to thoroughly fill the oil. It is of such adaptable structure that under the process of milling to which it is subjected, it works perfectly with the flake graphite pigment. The oil used is only of the purest grade of well settled and well boiled linseed oil, and is very carefully inspected and tested by chemical experts. The small percentage of drier used is the very best procurable.

Dixon's Silica-Graphite Paint comes ready to apply, and only in original packages. It is the result of over forty years of constant endeavor to produce the best article possible, and behind every gallon is that well known Dixon pride of manufacture. The paint spreads easily under the brush and readily covers 500 to 600 square feet to the gallon. It does not require any elaborate specification for shop or field mixture, and avoids the attendant evils of poor materials and poorer results.

In accordance with the physical law, that all particles held in suspension assume positions in the direction of the lines of least resistance, it follows that the flake particles of this pigment, under the sweeping pressure of the paint brush, lie flat against the surface over which the brush is

moving. The flakes overlap one another, forming layers—the number of which is practically unlimited, being confined only to the number of coats and the thinness of the flakes.

After the paint has set and the surface gloss of oil has been destroyed, the outer layer of flakes is exposed. As the flakes are absolutely inert, it becomes a question of reaching the binder, which will in time lose its siccative or binding quality and release the flake, this particle having practically but two dimensions (length and breadth) leaves no cavity or pocket in the film, which therefore continues to shed water perfectly down to the last layer of pigment. This process of removal, owing to the intracibility of these flakes, is, as you can see, a very slow one. Compare this with every other pigment ever sold in so-called protective coatings. Without exception they occur in one or more of the following forms, viz: cubical or spherical. When the binder releases one of these particles a pocket of exact shape remains, in which moisture is retained, thus preventing the rapid shedding of water and removal of corrosives such as alkali, sulphides, etc. These compounds are destructive to the binder and once firmly seated in such pocket will rapidly destroy the paint film.

There are authentic instances of twenty-five years' duration and in just the surroundings as regards moisture and sulphurous fumes that would utterly destroy any other paint, where Dixon's Silica-Graphite Paint is wearing perfectly, and, at the same time resisting atmospheric action.

Some pigments put upon the market are chemical compounds, for instance—the oxides and carbonates of lead, oxides of iron, etc., and as such under the inexorable laws of chemistry, are readily acted upon and during reaction either an increase or a decrease in volume takes place, both of which would militate against the film. The amorphous varieties of graphites are exceptions to this, but assuming the shapes they do are practically valueless as protective pigments.

In the past Red Lead has been largely used as a protective coating. The material is an oxide of lead and as such is readily acted upon by the sulphurous compounds, becoming a sulphide and taking on an increase of about 30% in volume during the reaction, which is sufficient to disrupt the paint film, also it is approximately cubical in shape. When a steam plant is placed in operation in a building, sulphurous conditions prevail and Red Lead immediately becomes anything but protective. The material is very dense, and is therefore hard to apply, requiring constant stirring. It must be mixed in exact proportions just before using. When allowed to stand after mixing it will quickly "set" and once this occurs, advocates of the material will tell you it is valueless. It is very difficult to apply, and has a very decided tendency to "run" even under the most skillful treatment. These faults, together with great cost, make it a rather undesirable material to use.

At the present time the market is flooded with so-called Graphite Paints, most of them composed of other forms of carbon and in every case are of amorphous structure. They may assume approximately cubical or spherical forms, and as such are anything but ideal paint pigments, from the fact that under wear and tear the particles are removed

from the binder leaving cavities or pockets. This prevents the paint film from readily shedding water, and in fact each pocket holds the moisture and with it every known corrosive element present in the air or water. This is the primary weakness, then comes the element of cheap composition wherein cheap oils, cheap driers, and cheaper pigment play their individual parts. Chemical analysis of these paints show, that very few (if any) contain more than 16% of graphite or carbon, and *that* usually of a very low grade. All of them have been placed on sale within the last fifteen years, and are made by houses that make many grades and kinds of paint. The best one of these paints is sold as "Pure Graphite," while eminent geological authorities pronounce the raw product—"A Carbonaceous Shist." If the "Best" is a material of that sort, what must the "Worst" be?

ROBERT H. FISHER.

A TEST SCHEME FOR PROTECTIVE PAINTS.

Suggested to the American Society for Testing Materials, by
Mr. Malcolm MacNaughton, M. E.

In outlining a test scheme for protective paints, the following points are to be considered:

- Cost.
- Application.
- Drying.
- Adhesion.
- Elasticity.
- Porosity.
- Resistance to Mechanical Injury.
- Permanency.

1st—Cost. This point may or may not be included in a scheme for testing paints. It is properly included when the test is made by the person who is directly interested in the economic side of the question, and may properly be left out by him who has to determine only the value of the paint as a protective coating.

2nd—Application. This bears on the facility with which the coat may be applied, whether it may be properly applied over other and different coatings, whether it may be applied at all ordinary temperatures, and whether or not any special treatment of the surfaces is required. Knowledge on these points is only to be had by actual trials.

3rd—Drying. Continued observation during an actual trial will give all the information necessary on this point. But it is necessary that observations be made up to the time that the paints are actually hard and dry, because it may happen that one paint may begin to dry on the outside more rapidly than another which may finally pass it and become dry first.

4th—Adhesion. This is a most important point, it being self-evident that any paint to protect must stay in place. Relative adhesion, when decidedly unlike, may be detected when the paints are fresh by simply peeling off at the point of a chisel. But adhesion must persist throughout the life of the paint, so that it becomes necessary to test the paint films after having given them somewhat the effect of age. Probably as fair a way as any, to secure this effect, is to subject plates of painted iron or tin to repeated alternations of heat and moisture. Tests for adhesion should

be made before any others, as a paint coat which lacks this quality, when new, should be immediately condemned.

5th—Elasticity. This quality enables a paint film to accommodate itself to its base during changes as a result of variations of temperature or form. When we consider the great difference in the coefficient of expansion between the metals and oils, we see that, unless there is a certain degree of elasticity, rupture of the paint films must occur. Films of the paint, detached from their support, are best for determining relative elasticity. The simple test of bending is enough to give information where the difference in elasticity is enough to be of importance.

6th—Porosity. Since iron does not rust except in the presence of moisture, it is important that the protecting film of paint should be non-porous in the highest degree, without the sacrifice of other desirable qualities. This is a test which should be applied when the paint is in its most perfect condition, as a protecting film. It is not correct to test by repeated evaporations of water in a painted dish, because the deterioration of the paint by these repeated evaporations is also involved. The method in which postage stamps painted on glass, covered with a couple of coats of paint, and when dry, immersed in water, seems good. This may not be exactly correct in its technical aspect, but should give approximately correct results when made for comparative purposes.

7th—Resistance to Mechanical Injury. Tests to determine this need be made only in special instances where conditions are such that protective coverings may fail from this cause. Where such a test is advisable, it is easily made by allowing a streak of sharp sand to flow over the painted surfaces from a hopper, the sand being returned from time to time. The test is easily made more or less severe by varying the height of fall and angle at which the stream strikes the plate.

8th—Permanency. Protective coatings may be assured as quickly reaching their condition of greatest efficiency. We may consider that when a paint has become what we call dry, it has reached that condition. From that point of great efficiency, there is a gradual, more or less rapid progression toward ultimate failure. The paint in which this progression is slowest is to be taken as the most permanent. The value of this function must be determined entirely separate from the determinations of the other qualities, and the test should be so conducted as to bring about a slow change, rather than to destroy. The test should be made with especial reference to the conditions under which the paint is to be used. The test should be made with paint films which have been detached from their support. They should be of sufficient thickness, not less than two coats, and probably three would be better. They may be prepared on thin zinc plates, the zinc being dissolved off by dilute sulphuric acid, or they may be prepared on cardboard covered with a paste of dextrine. When dry the whole is immersed in water and the support soaked until it may be separated from the film. Films of various paints to be compared are subjected to the same set of conditions and their relative action observed.

It is much easier to detect changes in films separated in this way than when attached to their supports.

The foregoing tests, while simple and probably capable of much improvement, are sufficient to give considerable information when made carefully for comparative purposes, yet at the same time they do not give exact values. Under any one test in question, it will be easy to show that one paint is better than another, but not so easy to show just how much better. Judgment in this matter can only come with experience. It is to be supposed that any test of paints is for the purpose of selecting the one most suitable for some set of actual conditions, and that these actual conditions indicate the relative importance of the tests to be made.

Rate of drying, Resistance to Mechanical Injury, Porosity, Adhesion, etc., may each in turn be the feature of great importance. It would certainly be an absurdity to lay much stress on relative porosity of a coating which was to be applied to bridges in Arizona, or pay much attention to the matter of elasticity in a paint for iron work in a damp sub-cellar.

Unfortunately, no paint has yet been discovered which possesses pre-eminently all the qualities needed for iron and steel protection, so it becomes necessary for us, if we hope to get best results, to determine in some way what particular product is at least as good as any other for the case in hand. Our tests may not always indicate the very best, but they will undoubtedly put aside the very worst, and this result alone will be a great gain. It seems to be entirely within the scope of this committee, in addition to suggesting methods of making tests, to suggest also a scheme for combining the values obtained by such tests into an equation, the solution of which will give relative values in particular cases. For instance, the efficiency of a coating may be represented by an equation where one side consists of the sum of the values for the various functions previously determined by experiment, each multiplied by a factor, which represents its particular importance in any specified case. Thus in different cases we may take the factors as follows:

| | | |
|--|--|--|
| Cost.....1 | Cost.....1 | Cost.....1 |
| Application..1 | Application..1 | Application..1 |
| Drying.....4 | Drying.....1 | Drying.....1 |
| Adhesion....2 | Adhesion....1 | Adhesion....1 |
| Elasticity...1 | Elasticity...1 | Elasticity...1 |
| Porosity....2 | Porosity....1 | Porosity...10 |
| Resistance to Mechan- ical Injury } .3 | Resistance to Mechan- ical Injury } .1 | Resistance to Mechan- ical Injury } .1 |
| Permanency..2 | Permanency..6 | Permanency..1 |

The first set might be used in testing paints for steel ears, the second for highway bridges, and the third for iron work in locations subjected to steam and acid vapors.

Such a scheme will have its limitations and variations due to the personal equation of the man operating it, but eventually there would come a certain degree of standardization.

These suggestions are presented with the idea of showing the advisability of a scheme which will necessitate the consideration of all the points involved.

With regard to time tests, not much need be said except that the pieces to be exposed should have at least 2 sq. ft. of area on each side, and should have two coats, the second

applied only when the first is dry. The second coat should be dry before exposure occurs, and the exposure should be the average conditions it is desired to protect against. The test piece should consist of vertical and horizontal parts, the latter to serve as a resting place for water, cinders, dust, etc. Where such pieces have been examined from time to time, such places should be covered by paint to prevent extension of corrosion from the damaged surfaces. This patching up paint should be of a different color than the paint which is being tested, to avoid any confusion.

PAINT FOR GALVANIZED IRON.

Owners and painters in every city and town, complain of the rapid destruction and ragged appearance of paint on galvanized iron sides of warehouses, piers and cornices of buildings.

We have a great deal of galvanized iron work in the ornamentation of our factory buildings, and have no difficulty with the paint peeling and blistering. Before painting our galvanized iron, we brush it thoroughly with a stiff brush, and apply a well brushed-on coat of Dixon's Silica-Graphite Paint. A simple, cheap and effective method.

We have our own experience and that of hundreds of customers to prove that Dixon's Silica-Graphite Paint is a particularly tenacious and lasting coating on galvanized iron surfaces.

A pleasing effect is secured by using two Dixon colors for body and trim.

Dixon's Silica-Graphite Paint is manufactured in the Olive Green, Natural or Graphite Gray, Dark Red or Black.

Owners and master painters are invited to test this paint on galvanized iron surfaces to demonstrate to their satisfaction that it is indeed the ideal paint in adhesion and lasting qualities.

SAFETY OF LIFE.

Railroad passengers, fearful of collisions and accidents occurring in railroad travel, oftentimes give more attention to little details concerning their safety while enroute than is generally credited.

Passenger agents tell us that they quite frequently have requests for booklets, illustrating their bridges and signal apparatus. Ticket agents sell daily a great many short-timed accident policies.

The railroad making a feature of giving wide publicity to illustrations of bridges and signal apparatus, showing their precautions in the way of the most modern type of bridges and signal arrangements for the protection of life, will secure the confidence and support of travelers.

The deterioration of steel bridges and signal supports by rust has caused anxiety to many railroad officials. A protective material that will absolutely prevent rust for a long period of time, is now quite extensively used in the Construction and Maintenance Departments of railroads, and is known as Dixon's Silica-Graphite Paint.

Carthage, N. C., Oct. 24, 1903.

I have received your sample 'Eterno' copying pencil. Please accept my thanks. It fills every requirement and is up to date.
H. B. Gagle.



HOTEL BELMONT, NEW YORK CITY.

WARREN & WETMORE, Architects.

F. A. BURDETT, Consulting Engineer.

MARC EIDLITZ & SON, Contractors.

At the S. W. corner of Park Avenue and 42nd Street, New York City, there is now being completed a twenty-seven story fireproof hotel, which extends from 41st to 42nd Streets.

The design is of particular interest on account of the magnitude of the structure; the provisions made for large, unobstructed rooms and for wind bracing; the system of plate girders above the street level which carry many stories of heavy columns; and because five of the twenty-seven stories are built below the surface of the street in a pit excavated in solid rock.

The four tracks of the Rapid Transit Railway, which emerge near the hotel from the Park Avenue Tunnel, turn into 42nd Street with a minimum radius of 180 ft., and pass under the corner of the building with their rails at a level about 25 ft. below the surface of the street. The subway structure here rests on solid rock and is built with steel columns and roof girders filled in with brick and concrete. The roof girders are made special, and are proportioned to carry above the tracks a number of main

columns of the building, which are twenty-three stories in height and have loads of as much as 2,360,000 lbs. each.

Unusual conditions and requirements were met with in the execution of the work, which was of especially difficult character for the substructure.

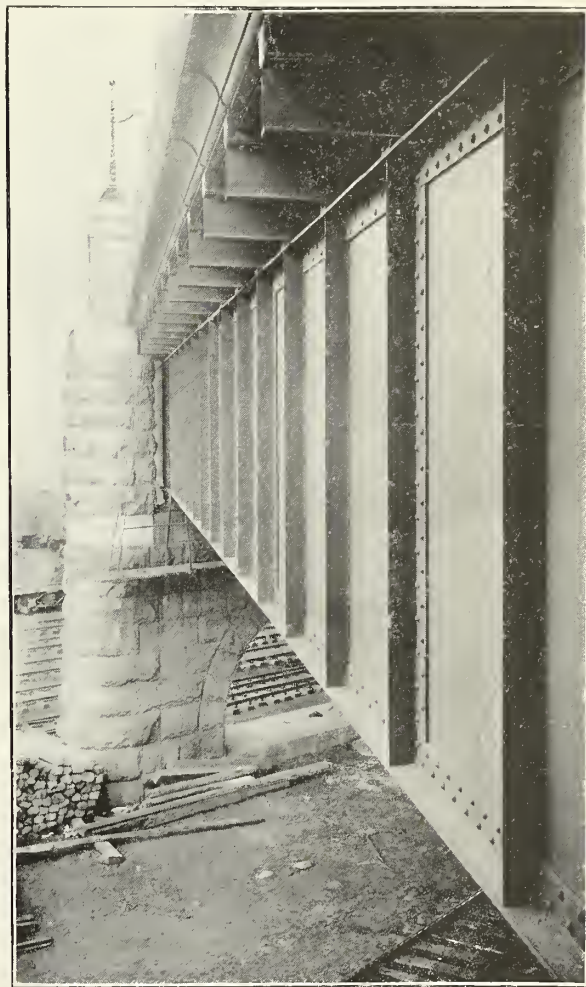
—*The Engineering Record.*

The structural steel work of this magnificent hotel is preserved against corrosion with Dixon's Silica-Graphite Paint, Natural and Olive Green Colors.

WILLIS AVENUE BRIDGE.

Crossing N. Y., N. H. & H. Freight Yards and Harlem River, New York City.

The girders of the Willis Avenue Bridge are 15 ft. in height. They were painted during erection in 1899 and 1900 with two coats of Dixon's Silica-Graphite Paint, Black.



The above view of one of these girders was taken in April, 1904, and shows the absolutely perfect condition of Dixon's Silica-Graphite Paint after four years' service. All of the girders were carefully examined at the time the photograph was made, and Dixon's Black on the rivet heads, angles, flanges and webs, was found to be in an unbroken condition, and giving true protection to the steel. These girders are fully exposed to sea air and to sulphurous fumes from shifting engines.

DIXON'S graphite publications are sent free of charge to all who are interested in the subject of graphite.

PACKING CYLINDER HEADS AND VALVE STEMS.

By W. H. WAKEMAN.

When the head of a steam cylinder is fitted to the end of a cylinder so nicely that steam cannot escape through the space between them, we call it a ground joint, because the two surfaces are ground together until the fit is perfect. Of course, it is nice to have charge of machinery that is carefully fitted up, for, as a rule, it makes less labor and care for the engineer.

It does not cost much to make a ground joint on a cylinder head, as it is done before the studs are put in, when it can be turned at pleasure. If a similar joint is to be made on a steam-chest cover, or any other square plate, it becomes necessary to file and scrape the surfaces until both are perfectly true; then, when they are brought together, there can be no leak.

I have been disappointed in some ground joints, because they did not prove as durable as I anticipated. Hot cylinder oil under pressure will find its way into a very small crevice, where sediment from it is left, until the head is removed for some purpose. If it is replaced without being cleaned thoroughly, it is almost sure to leak, and the average engineer has neither the time nor the tools with which to repair it.

Many of them have not had the instructions necessary to enable them to do the work properly, but then it is not good policy to make that point prominent, so it is only mentioned as a side issue.

There is a right and a wrong way to clean a ground joint after it is taken apart, and it seems to be very natural for some of us to do it the wrong way. It is very easy to take any old file that may be at hand, and scrape the surfaces with it, and it is quite possible to get them clean too, but when we consider the very small depression that will cause a leak between two rigid iron surfaces, it is plain that a ground joint may be quickly ruined this way.

When a cylinder head is first taken off, both of the ground surfaces should be coated with kerosene oil, and left for several hours, or until they are to be put together again. A dull knife may then be used to scrape off any sediment that is found there, after which every inch of the surfaces should be rubbed by the naked hand, adding a little kerosene oil. Do not rub waste over the surfaces, as it is sure to leave lint there that will be as bad or perhaps worse than the sediment.

One of the surfaces should be given a light coat of good cylinder oil.

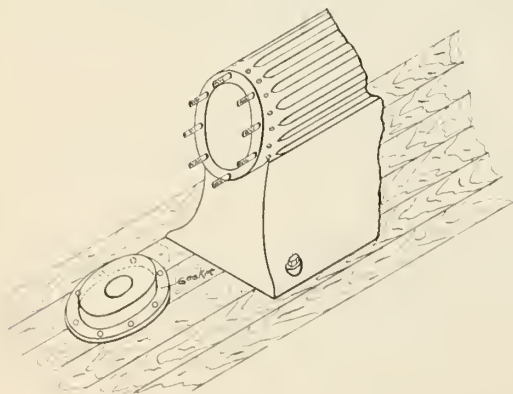


Fig. 1.

During the first few years that I enjoyed the honor of being called an engineer, my engine was not fitted with ground joints, consequently every time that a cylinder head was removed, a new gasket was required to replace one that was destroyed, and it spoiled a fair sized piece of packing to make it, but when I learned to use Dixon's Flake Graphite mixed with cylinder oil, on one side of my gasket, it could be removed many times without spoiling it. See Fig. 1.

If a sheet of packing large enough to make a cylinder head gasket is not at hand some asbestos wicking will usually answer every purpose. Cut off a piece the right length, then remove say, two strands of it, for about two inches from each end, make a lap joint that will be no thicker than the rest of the wicking, and put it in place on the head.

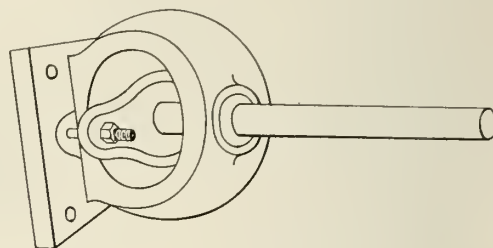


Fig. 2.

On taking charge of a Corliss engine several years ago, I found that the valve stems were in very bad condition. The outer end of one of these stems in its stuffing box is illustrated in Fig. 2. The valve crank is not shown, as it is unnecessary. Round, hard fibrous packing had been used, and kept in use so long that it had worn the stems badly, hence it was difficult to keep steam from blowing out at these points. Asbestos wicking did good work and was used for several years, but it was renewed once in six months.

Fig. 3 illustrates the valves of a Putnam engine forming part of my plant. These are of the double beat poppet type, the stems working through vertical stuffing boxes. They

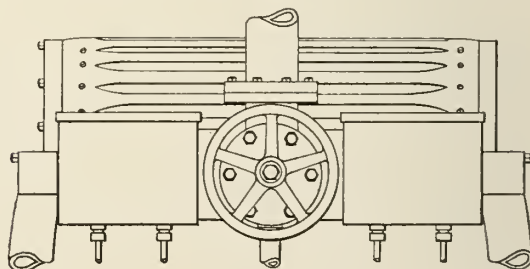


Fig. 3.

are lifted by cams, and caused to fall by the force of gravity, consequently they must move easily or else they will not work properly.

Probably there are several kinds of packing that would fill every requirement for this place, but I have tried only one during the ten years that I have had charge of the engine, and that consists of asbestos wicking thoroughly coated with Dixon's Graphite and it is perfectly satisfactory, therefore I find no need of making a change.

Engineers are sometimes troubled to keep such joints packed so that they will not leak steam, and still allow the stems to move freely, but much of the dissatisfaction is caused by failure to renew the packing in time to prevent it from becoming hard, hence the stems are either scored or else worn tapering, and it does not require a mechanic to see that while in such condition it is impossible for them to be satisfactory.

The two kinds of valve stems above mentioned are very different, because one has a semi-rotary motion, while the other slides like a piston rod, yet the asbestos wicking thoroughly coated with graphite gives excellent results in both cases.

It is a good plan to take several strands of this wicking and make a "rope" of suitable size for the stuffing box to be packed, but each strand ought to be coated separately. By partially untwisting a piece, it can be easily broken, and this is better than to cut it off square, because when broken the ends are left tapering, so that when put in place they lap over each other and make a ring of uniform size. Of course, it is possible to make the rings the right length to exactly encircle the stem to be packed, but it requires care to do it, and in the rush of work found necessary in many plants, such small details are overlooked, yet they form an important part of the successful steam engineer's duties.

There is another kind of valve stems that merits special notice, as they are used much more extensively than either of the foregoing. I refer to the globe, gate, angle and cross valves found on the steam and hot water piping of every steam plant.

Tons of packing are used every year on these valve stems, and the old-fashioned candle wicking is no longer satisfactory, as it does not last long enough to be a paying investment. Asbestos wicking furnishes the fireproof quality and Dixon's Graphite supplies the lubricant necessary, therefore this forms a combination that is hard to beat.

Some of these valve stems are fitted with a small gland under the nut, but in many others this gland is omitted. Where it is in use, the packing may be wound in either direction, but if the wicking is put directly into the nut it should be wound in the opposite direction from which the nut is turned when screwing it into place. If this plan is followed it prevents the end of it from being doubled up into a bunch when the nut is turned.

If you have never given this small detail due attention, just take a valve, put some wicking into the nut and observe the effect of winding it in each direction.

A GENTLEMAN writing from England about lead pencils, uses a postal card showing a very lovely picture of the "Menai Straights from Llanfairpwllgwyngyllgogerychwyrndrobwllandysiliogogoch." If Mr. Bert Skinner in his Maine trips finds anything to equal this, he is welcome to it.

Clemson College, S. C., Oct 16, 1903.

I received your 'Eterno' pencil a few days ago. It is the best copying pencil I ever used. Thanks for same. I will remain,

D. M. Fraser,

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequalled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

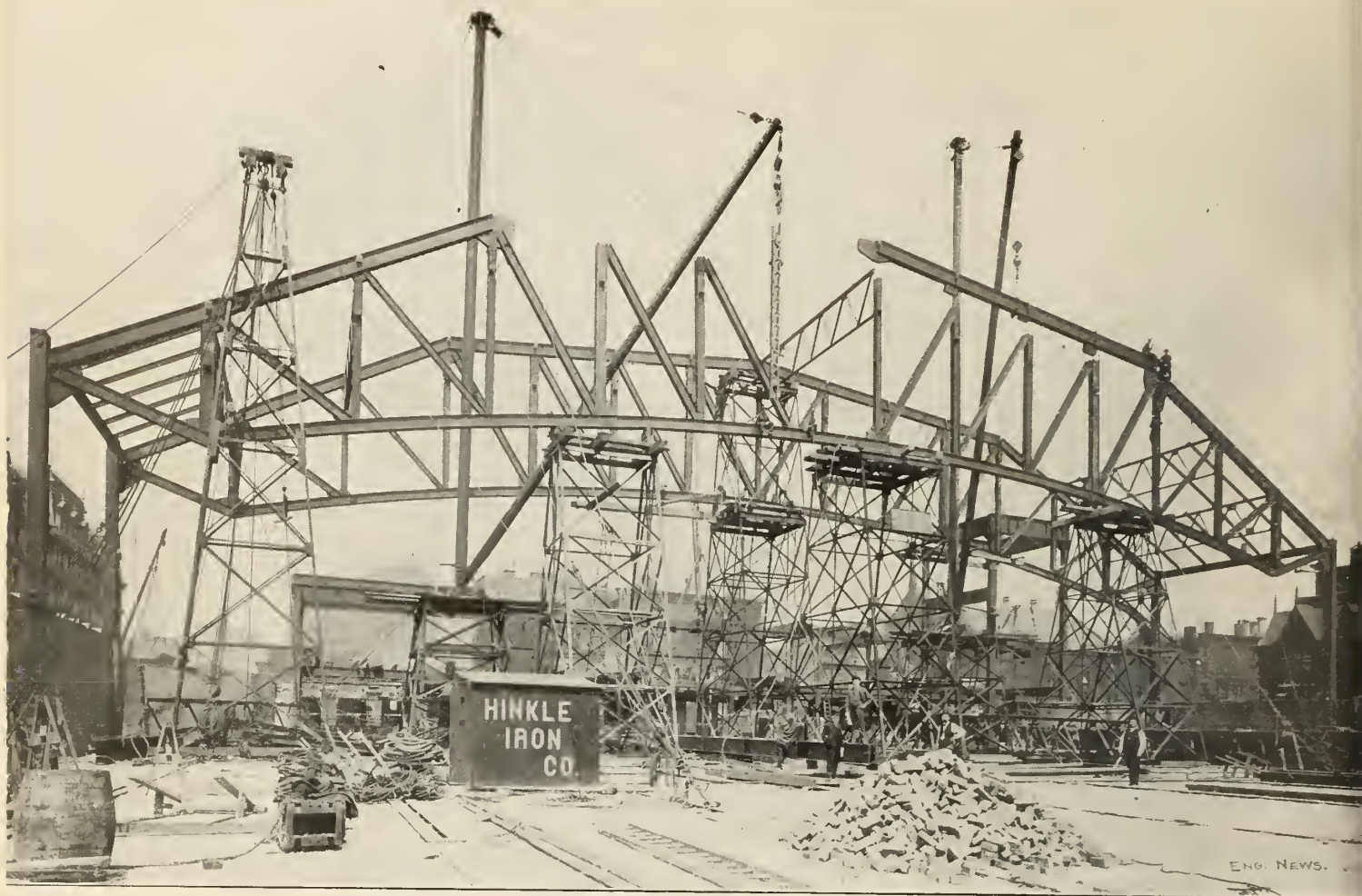
Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.



Clinton & Russell, Architects.

ERECTING STEEL WORK OF THE NEW SEVENTY-FIRST REGIMENT ARMORY. NEW YORK CITY.

The Steel is Being Painted with Dixon's Silica-Graphite Paint, Dark Red and Olive Green.

COLORS AND SPECIFICATIONS.

An excellent little folder in duotone, illustrating five types of steel and iron construction. The Specifications suggest practical methods for construction and maintenance painting of steel and iron, based on our experience of 40 years as manufacturers of a protective paint and with an intimate knowledge of the paint requirements of civil engineers, architects, painters and the manufacturers and

owners of steel and iron structures. Accompanying the Specifications are the four shades in which we manufacture Dixon's Silica-Graphite Paint.

The folder will be sent to anyone wishing information on good paint and good painting.

PAINTING SMOKE-STACKS.

Heated surfaces are most difficult to keep well painted and protected.

A good paint and a good painter is the prescription we offer. Dixon's Silica-Graphite Paint, Black, *ready mixed*, has cured thousands of smoke-stacks from that active destroyer, *Rust*. Dixon's Silica-Graphite Paint takes firm hold on the steel, and is not easily dislodged.

Dixon's pigments are inert and unaffected by heat or gases. Mixed in correct proportions with best boiled linseed oil, a tenacious, elastic, heat and weather resisting paint results.

The binding oil is largely protected by the *Flake Graphite* pigment. The proposition is not a theoretical one but has been demonstrated as true on thousands of stacks in different climes. A stack painted with Dixon's Black is free of blisters, discolorations and rust. Dixon's Black covers well and looks well during its long life.



Graphite

Vol. VI.

NOVEMBER, 1904.

No. 12.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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THE STORY OF THE LEAD PENCIL.

For a number of years the Dixon Company have issued a little booklet called, "The History of a Lead Pencil." In this book is told the story of how the lead gets into the pencil, as well as can be described in print. It was intended at first mainly for commercial use, and for answering some of the many questions which are daily poured into the Dixon mail bags. It was gotten out to describe the pencils, their styles, shapes and sizes, and the erasers attached to them. It tells some facts about the works, and how they came to be where they are, and also tells how the leads are put into the cedar, and how the pencils are stamped and finished.

To further supplement this little book, the Company issued last years what is called the Dixon "Pencil Guide." This

"Guide" tells how to find pencils that are used by bank clerks, bookkeepers, carpenters, conductors, entry clerks, insurance agents, metal workers, railroad companies, salesmen, stenographers, telegraphers and a great many others. It tells why they should use these particular kinds of pencils, and it explains it so that it will be clear to every one. It tells why these pencils are made in different grades, and why a pencil of a certain grade, although it is excellent for one kind of work, is utterly useless for any other kind of work to which it is not adapted. This book is having a phenomenal success, and now to further supplement it, the Dixon Company are about to issue another booklet, called "Pencil Geography." This little book is patterned after the old style geography that was in vogue in the schools some forty or fifty years ago. It consists of a series of questions and answers, and in it is told in a few pages the story of the materials out of which the Dixon Pencils are made, where they come from, and how they are put together. This little book is illustrated with maps and original drawings made with the Dixon Pencils, and it will be one more added to the already large library of publications which the Dixon Company are continually issuing.

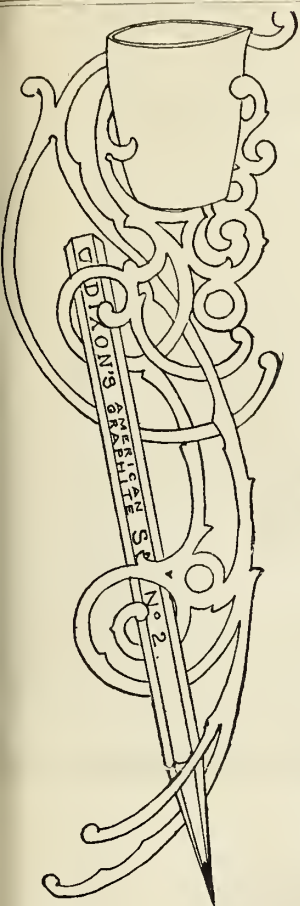
Any of these books will be sent, free of charge, to anyone who writes for them.

A POOR CHOICE.

Once there was a member of a school board in a certain city, who, when the question of the purchase of pencils came up before the committee, made the statement that he thought the best pencil to buy was a poor pencil, because, he said, he often noticed that a poor pencil lasted as long as a good one. We immediately asked him if he hired his teachers on the same plan, that a poor one would last as long as a good one, or if he bought other things on the same general idea; he at last confessed that he did not, but said that he did not know as there was any difference in lead pencils, anyway.

We showed him that at the present time the Dixon Company were manufacturing over seven hundred different kinds, shapes, styles, colors and sizes of pencils, and he began to see that there was as much difference in lead pencils as there was in almost any article that was sold, and that in buying a lead pencil great care has to be shown in selecting the right pencil for the particular kind of work desired.

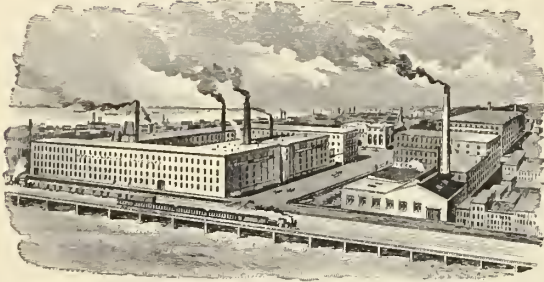
Dixon's graphite publications sent upon request.



is a little larger book than "The History of a Lead Pencil," and is illustrated with drawings made with the Dixon pencils. This book is used to classify as far as possible under the heads of the different grades of pencils, just which pencils are best for certain kinds of work. The

ESTABLISHED 1827.

INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

BRANCHES AT

68 Reade St., New-York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., November, 1904.

"DIXON ON A VACATION."

The Adirondacks (tell it not to Russell Sage) are a noble place to spend a vacation. They are remote, the place is full of mountains and covered with lakes; the forest is dense and thick, and the solitude is perfect; the scenery magnificent, and hunting and fishing the best in the world.

We started with a beautiful surrey, two-seated, two fiery steeds and a driver, followed by a boy with a one-horse wagon, with the trunks. We left the Dixon graphite mines one morning and pointed West. Two days are spent at Brant Lake. We drove one day to Schroon Lake for dinner and another day to Warrensburg for dinner. Brant Lake, if not the most notable, is certainly the most beautiful lake in the Adirondacks; its surroundings of mountains, and noble waters twelve miles long, will sooner or later make its fortune. One day we drove from Long Lake to the camp of the late Wm. C. Whitney, on Little Tupper, and the way there was through interminable forests, eleven miles long. The Whitney camp was the only house in sight. It is perched on a hill on the lakeside and commanded the whole situation. The sensation of remoteness was perfectly lovely. The caretakers prepared us dinner and served it in the Whitney dining room. We were permitted the run of the house, which was fitted up in the most sumptuous and luxurious manner. We sat for hours on the piazza that afternoon, so far away from civilization that the scream of the locomotive could not possibly reach

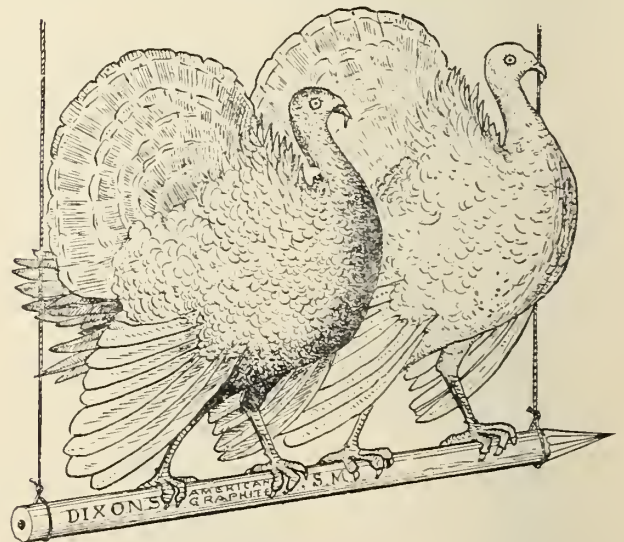
us. We lingered until late, and drove away in the evening, regretting that the happy hours flew so fast.

Another day found us at Aiden Lair, off the beaten track, secluded ten miles in the thick forest, no other house visible, no other house for miles around. Here Theodore Roosevelt stopped when he came down from Mount Marcy on getting news that President McKinley had died. Here horses were provided and the proprietor of this hotel drove Mr. Roosevelt to the nearest railway station. President Roosevelt's photograph, bearing his signature, acknowledging this courtesy, hangs in the parlor. The high mountains, interminable forests, solitude, blue sky seen through the trees, the breathless quiet, were all superlatively lovely.

Another day we spent at Blue Mountain and Racquette Lakes. Here we left the carriage and took to the boats, passing from Blue Mountain Lake to Racquette Lake over three streams of water, Eagle Lake, Utawana Lake and Marion River. Stopping at Casino Wharf of "The Antlers," at Racquette Lake, gave one the keenest pleasure. The elevation was 1,800 feet and the temperature 45 degrees, the day cloudless, and the lakeside studded with the camps of various New York millionaires, for instance, J. Pierpont Morgan, Andrew Carnegie, Timothy Woodruff, and others. The trip occupied some eleven days. The distance covered was 310 miles in the carriage. All along this line are studded good modest hotels with good rooms and good fare, and at a low price. The average temperature was between 40 and 50 degrees, and average elevation above the sea was from 1,800 to 2,100 feet.

—JOHN A. WALKER.

A PUZZLE PICTURE.



Two products of the United States that are known the world over. One is specially dedicated to the month of November and the other to every month of the year. Both equally appreciated by every man, woman and child.

OUR SHARE.

We very likely get our share of business, as a ship lately sailing for San Francisco, Seattle and Vancouver carried 603 packages of Dixon's Graphite products, a total altogether of 71,460 pounds.

Dixon's Flake Graphite saves time, oil and trouble.

COMMITTEE REPORT ON "WHAT IS THE BEST PREVENTIVE OF RUST ON STREET CARS."

Presented at the Annual Convention, Master Car Builders'
Association, Saratoga Springs, N. Y., June 1901.

"Your committee feels that in consideration of the limited experience in the use of steel cars, and in view of the lack of definite results from experiments which have been made, and are being made, that its knowledge on this subject is not complete enough to allow of positive recommendations being made as to the best methods of treating steel cars in order to prevent the formation of rust on same. It would, however, submit to the association the following suggestions :

First—For new cars :

(a) The steel should be cleaned thoroughly of all rust and furnace scale before the car is assembled.

(b) All joints before assembling, should be thoroughly coated with coal tar.

(c) After car is assembled all grease should be thoroughly removed from the steel and same given a good coat of carbon or graphite paint on the outside and underneath, and the inside a heavy coat of crude petroleum, coal tar applied hot, or some similar substance.

(d) The outside to be given a second coat of graphite or carbon paint, as may be desired.

Second—For old cars :

(a) All the scale should be removed wherever it appears on the car by steel brushes and scrapers, and in the case of the inside of the car, by any of the above methods or by the use of pneumatic hammers or mauls.

(b) After all scale and rust have been removed the car should be thoroughly cleaned with steel scrapers or wire brushes and blown out with air, in order to present a clean surface for the paint.

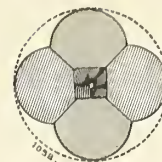
(c) The methods for paint recommended for new cars should be followed out in the case of old cars, after a clean surface is obtained.

Third—As some of the most prolific causes of deterioration of steel cars are the loading of same with hot billets, and use of mauls, bars, etc., on the outside to assist in the unloading of cars, and the allowing of cars loaded with soft coal to stand a long time with the load in same, it is recommended that steps be taken to do away with these practices as much as possible.

Your committee believes that if the above recommendations are followed out, and if care is taken to repaint the outside and underneath cars at least every eighteen months or two years, coating the inside with crude petroleum or coal tar about once a year, that excellent results will be obtained.

Your committee has refrained from going into the sand blast question in detail, as it is an open question as to whether the use of the sand blast is desirable for this class of work, on account of the hardships it imposes upon the men operating the same, and also on account of the expense attached to its use, due to the very rapid deterioration of the hose and nozzels."

"PLUMBAGO LAID MANILA ROPE."



The C. W. Hunt Company, of West New Brighton, N. Y., manufacture a special rope made from the strongest quality of selected manila fibre, laid up with a tallow and plumbago lubricant, having the twist of the threads and of the strands carefully adjusted to the class of work to be done. The plumbago reduces the internal friction in bending over the pulleys, and the tallow makes the rope partially waterproof. It is said to be the only transmission rope that is not materially injured by exposure to the weather.

The C. W. Hunt Company make this rope for the transmission of power in rope driving and for general hoisting purposes. The coils are ordinarily 1,100 feet long, or they can be cut to any length desired. It is a four-strand rope, as shown by the cut herewith, and it is said to have been abundantly proven to have more durability in service than the ordinary three-strand. It is what is known as a four-strand rope with heart as shown in cut.

IN "DARKEST AFRICA."

The captain of a steamer on the Upper Congo, who has for seven years past been engaged as foreign explorer, traveler and scientist, writing to a friend in the Dixon Company, has the following to say about Dixon's Graphite Products for the foreign trade :

"I believe that if your Company would make a push for the African trade they would find a great market here in cannibalistic Congo for many of their graphite products.

"We have some fifty to one hundred millions here who would be very glad to make use of Dixon's stove polish and paint for personal adornment, very much as the ladies in England and the United States use rose chalk and various other cosmetics. There would be a further advantage here 'In Darkest Africa,' because the native would use the materials from crown to toe, and the custom here demands that this personal adornment shall be made daily. Fashions rule here the same as in foreign countries.

"At the present time pulverized charcoal mixed with palm oil is largely used. This, however, finishes up the native in what painters call 'flat finish' and, if one of the belles here should start the fashion of a plumbago finish, it would certainly be all the rage. If your people would like my aid in this line, a surprise may be awaiting you."

GRAPHITE FOR FISH LINES.

We have lately received an inquiry on graphite suitable for polishing fish lines; the idea being that a fish line when polished with graphite does not wet as easily, does not tangle as readily, and in fly fishing the line polished with graphite offers less resistance to the air and a much greater cast can be made.

Our correspondent claims that all these statements are based on experience, and that they are incontestible facts: We, however, give them publicity, and will leave it to our readers, who may be fishermen, to prove or disapprove.

SOMETHING ABOUT CORLISS VALVES.

By W. H. WAKEMAN.

Engine builders who manufacture flat valves of any type, claim that they can be used longer without leaking steam than any other kind, and when repairs are required after a long term of service, a flat surface can be made perfectly true with the least labor possible.

On the other hand, those who manufacture engines with Corliss valves are sure that a circular surface is the best and most durable. They also claim that when repairs are at last required, this style can be made as good as new in short order.

The facts in the case are that there is very little difference between these two kinds, when all points are considered. If a flat valve could have its driving mechanism located on a line with the face of it, then there being no tendency to rock, the surface of both valve and seat would wear evenly and true, provided there were no hard or soft spots in the iron. As these two conditions have never yet been satisfactorily met, perfection along this line has not been achieved.

Corliss valve seats are bored out, hence they are supposed to be in the form of a true circle. The valves are then turned to form part of a circle the same diameter, less a suitable allowance to prevent undue friction caused by binding of the valves.

If it was possible to always make the exact allowance required, then fit the valve stems into bearings in which no lost motion is found when new, and none results from wear, also to make and maintain a perfect fit between valve and valve stem, then these valves would practically never need repairs. As these conditions are difficult or impossible to meet, slight wear must be expected.

Either kind of valves just mentioned should last for ten years without serious leakage, if properly made and cared for.

A flat valve can be taken out, planed off, scraped to a true surface by aid of a surface gauge, and thus made to accurately fit a similar surface on its seat. Of course it is possible for a good mechanic to file and scrape the seats until they are perfect.

It is quite possible to secure an equally good job on Corliss valves and seats, if sufficient care is bestowed upon them. The principal objection to this process, from the writer's point of view, is the way in which it is conducted.

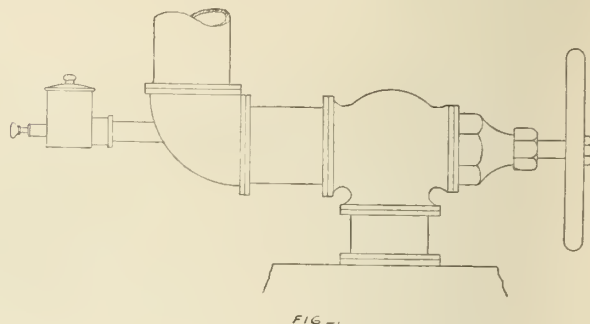
When a set of Corliss valves need attention, the job should be placed in the hands of an expert, as its importance demands it. There is probably no better way than to send to the shop where that particular engine was built, or where others of a similar kind are in course of construction, and engage a machinist who has had charge of fitting the valves to their seats. By adopting this plan there is what is sometimes called "a fighting chance" to get a good job done.

The way in which it is frequently done may be described as follows: The castings required for the valves are ordered from the nearest foundry. Any available machinist is engaged to do the work, and he performs it to the best of his ability, but having had no experience in this particular kind of work, he either turns the valves on too

small a circle, making them leak when put into service, or gets them too large, so that it is almost impossible to move them with the ordinary valve gear.

The writer is well acquainted with specimens of both kinds, as above described, therefore this is no fancy sketch. Of course, the variations from correct sizes were very slight in both cases, but it was enough to cause trouble.

In the case where the valves moved hard I was asked to prescribe a remedy that would prevent the necessity of shutting down the plant. It was a rather difficult problem to solve, consequently work on it was begun without delay. A brass oil pump was purchased and connected into the ell



above the throttle valve as shown in Fig. 1. In reality it was located on the side of ell towards the reader, but the principle involved is better illustrated by presenting it as shown.

In this plant the best of cylinder oil, without regard to price, is always used. After adding as much of Dixon's Flake Graphite as the oil would hold in suspension when well stirred, the mixture was pumped into the steam pipe and carried to the valves and piston. The dose was repeated once in about ten minutes during the first day, after which it was given less and less frequently, as the valves worked more and more easily.

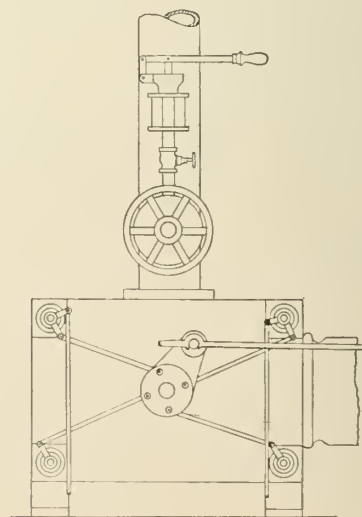


FIG. 2

When this treatment was begun, the valve rod vibrated badly on account of the heavy load on it, so that it was hardly safe to run the engine, but as the graphite was forced in between the rubbing parts, it produced glazed

surfaces that greatly reduced friction, therefore the vibration of rod was made less during the first day, and in a few more days it was almost entirely eliminated.

The result of this operation shows that the lubricating qualities of graphite are not changed by bringing it into contact with the high temperature of a steam chest under full boiler pressure.

While writing on this subject I wish to call attention to a small but significant matter. The brass oil pump shown in Fig. 1 is fitted with a screwed cover that must be removed every time the body of pump is refilled. Some engineers will take off a cover of this kind, fill the cup and replace the cover. Others remove the cover, and as they consider it too much trouble to replace it, said cover is left on the top of steam chest, or put on a convenient shelf. In course of time it is put somewhere else, and finally is lost. In the meantime, dust and dirt accumulates in the body of oil pump, the check valve becomes clogged with it, until finally the engineer condemns the oil pump and throws it into the scrap heap.

Has any reader discovered a steam engine from which the oil pump and oil cup covers have been removed and thrown away, that is otherwise kept neat and clean? Is such an engine ever kept in good repair and operated on a truly economical basis? As a rule these questions must receive a negative reply, and if there are exceptions to this rule we have not found them.

The oil pump shown in Fig. 1 is designed so that the engineer must force oil against steam pressure by main strength, as no leverage is employed, but the kind shown in Fig. 2 works easier on account of the lever provided. The body is made of glass, enabling the engineer to see at once how much oil there is ready for use.

The location of pump on the upper part of throttle valve makes a neat arrangement, and puts the pump where it is not in the way. It may not be quite as convenient for

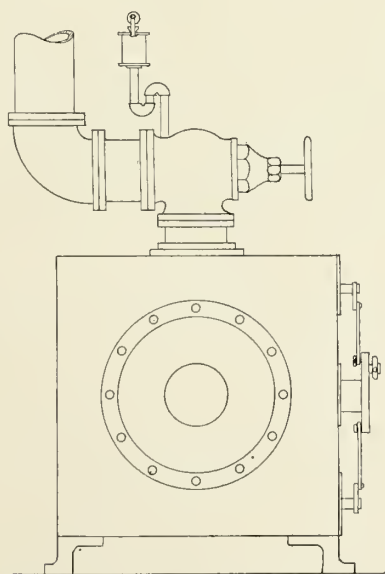


FIG. 3.

use, but inasmuch as it is required only occasionally, this should not be considered a serious objection. An engineer who attempts to have everything convenient without re-

gard to appearances, is sure to have an engine room littered with tin cans, oil barrels, bags of waste, various tools and scrap of all kinds.

More than one engineer who is not without faults otherwise, has kept a good position on account of scrupulous neatness, because appearances go a long ways toward making an engineer's reputation, and as a rule his just reputation is a true indication of his character, which is the real thing that counts for or against a man.

Fig. 3 is a side view of the throttle valve and oil pump illustrated in Fig. 2. It shows the arrangement of nipples and fittings used to provide a trap in which water collects and prevents the oil from being boiled by the heat of steam at high pressure.

Sometimes the end of Corliss valve stems, where they fit into bonnets on the side of steam chest, fail to receive the lubrication necessary for smooth operation, owing to tight fits at these points or from other defects.

Common brass oil cups are sometimes attached to the bonnets into which oil is poured, the cap screwed on and the outlet valve opened. This method of lubrication is a snare and a delusion, because the oil may go where it is wanted, and it may stay in the cup.

The method of supplying oil shown in Fig. 4 is much better, as the supply can be easily regulated, enabling the engineer to know just what he is doing in this matter, at all times.

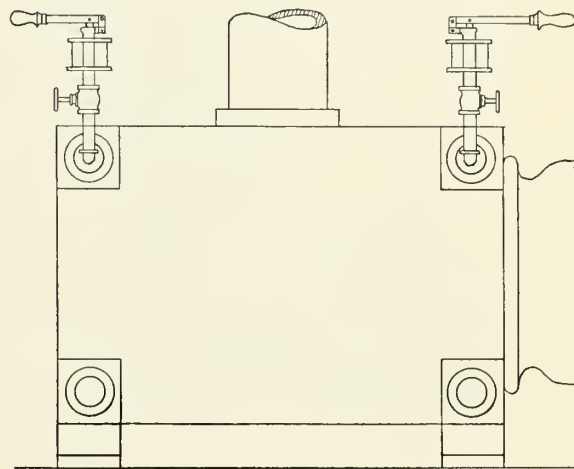


FIG. 4.

Readers sometimes glance at an illustration like Fig. 4 and lay it aside, believing that it means a considerable expense, but this idea is not always correct. These oil pumps made of brass, nickel-plated, and fitted with glass bodies ready for use, cost about three dollars each, which is certainly very reasonable. When we consider the value of good lubrication, especially under abnormal conditions, the expense of a set of these pumps is hardly worth mentioning.

The "shiny, unctuous veneer" that Dixon's Pure Flake Graphite puts upon cylinders, journals and bearings, well describes the effect of its use.

The graphite fills up the inequalities due to cutting or abrasion, making smooth, even surfaces.

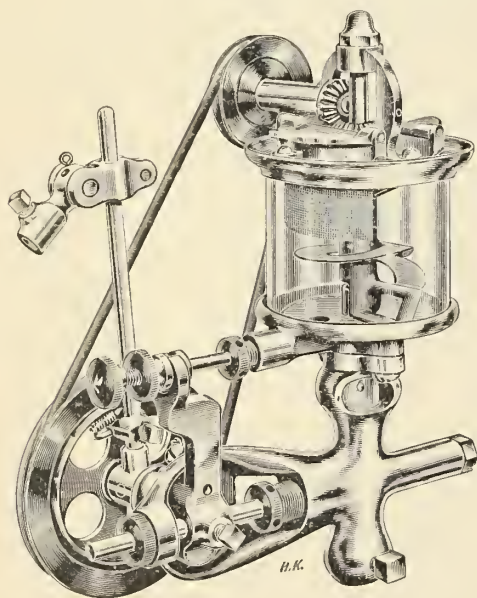
A SUCCESSFUL GRAPHITE-AND-OIL CYLINDER LUBRICATOR.

Despite the thought which has been directed toward permanently suspending flake graphite in lubricating oil so that it may be fed not only to machine engine bearings, but likewise to engine cylinders through the familiar oil cups and sight feed lubricators generally provided, success has not crowned these efforts.

Flake graphite, no matter how finely divided, is a solid substance with greater specific gravity than even the heaviest cylinder oils, and it eventually settles to the bottom of the oil cup or reservoir if allowed to come to rest.

It need hardly be added that the thinner the oil the more quickly will this settling take place, but it should be remembered that oil drawn from the barrel is usually thicker than the same oil after it has become thoroughly warmed up in a hot engine room or near a steam pipe or cylinder.

We advise engineers not to attempt feeding even the finest-ground graphite through a sight feed cylinder lubricator of the ordinary displacement pattern, for there is nothing to prevent the settling of the graphite, resulting



either in a clogging of the oil passages or in most of the graphite remaining in the reservoir instead of finding its way to the parts to be lubricated.

The use of force-feed oil pumps is increasing every day, because of their absolute reliability in delivering the oil to the working parts. As long as a force pump runs the engineer is assured that the oil is reaching the different bearings and valves, whereas gravity lubricators often become clogged up and stop feeding with most annoying results. The lubricant simply has to go when pumped, and there is the additional advantage that the flow stops when the engine stops and starts again with the first revolution.

Force-feed oil pumps are no novelty on the market, but only a comparative few are so designed that they will successfully handle graphite and oil.

So many engineers desire to use Dixon's Flake Graphite along with their cylinder oil that recently several force-

feed lubricators with special agitating devices have come into the market. Among the most recent of these is the Manzel Agitating force-feed and sight-feed Oil Pump, manufactured by Manzel Brothers, 46-48 Broadway, Buffalo, N. Y. The construction and working of this pump will be evident to our readers from the accompanying illustration.

The lever at the left is actuated by connecting it with one of the reciprocating parts of the engine, and a ball clutch on the under side of the drive wheel converts these oscillations into rotary motion. A cam on the shaft operates the two plungers, the upper of which draws and measures the charge, forcing it through the sight feed glass, while the lower plunger delivers the lubricant to the steam pipe.

A round belt and bevel gears, as shown, turn a paddle and spiral agitator in the oil cup, keeping the graphite in constant suspension in the oil.

This lubricator will successfully handle even thick mixtures of Dixon's Flake Graphite and oil and pumps the coarser or finer flake equally well.

Those who desire to acquaint themselves with the theory of graphite lubrication and its practical benefits are invited to write for a copy of "Graphite as a Lubricant," ninth edition, revised and enlarged.

A MESSAGE FROM INDIA.

An engineer in India writes us concerning Dixon's Ticonderoga Flake Graphite:

"Your letter and sample tins of graphite to hand, and am really thankful to you for the same, and for the address of the firm that I can get it from here, as it can be easily got, as I run into Calcutta. You must excuse me for not replying earlier, as I have just come off a month's leave and received the parcel just in time. After my arrival I was sent to bring a new engine just put together in our shops, which arrived from Dubbs & Co. I was careful to make good use of the graphite and ran my engine about 150 miles quite cool, and have had nothing hot on her as yet, while others, which are several, are having terrible trouble with their big ends. I recommended it to several and many of them are using the graphite now. Thanking you once more for the samples you so kindly sent me, just in time, especially for the new engine, I considered it a God-send."

What power you get for the coal you burn is largely a matter of how much indicated horse power you waste in useless work.

It has been repeatedly shown that a very little of Dixon's flake graphite added to the oil or grease, or perhaps used alone, in their stead, reduces the enormously costly friction loads carried in nearly all steam plants.

Lubrication methods must keep pace with modern heavy machine tools forced to tremendous duty.

Dixon's Pure Flake Graphite, bushing and glazing as it does the bearing surfaces, lowers the friction load and wholly prevents the possibility of abrasion. It renders unnecessary the wholesale drenching with oil in many shops.

WHAT GEORGE NEIGHBOR THINKS OF GRAPHITE AS A LUBRICANT.

Superintendent First Kicks and Then Admits Graphite is the Cheapest Lubricant Ever Used, and Orders it Put on All the Bearings.

*Joseph Dixon Crucible Co.,
Jersey City, N. J.*

Gentlemen:—I have been running engines for the past sixteen years, and in that time handled all kinds.

Engineers have "troubles of their own" in various ways, but the chord that clings to his heart closer than all others is that of proper lubrication.

When graphite was first brought to my attention as a lubricant I admit that I was skeptical, but the first trial satisfied me that thereafter it would be an indispensable article in my engine-room.

I will not endeavor to enumerate the many times that graphite has come to my rescue, but I remember one time very distinctly when I had charge of an electric plant that ran by both water and steam.

The transmission of power from the water wheel was made by gears, and the main bearing under the large gear wheel would not run cool—we tried oil and grease of all kinds without result, and while I had advised graphite from the start, it was not until we had melted the Babbit out several times that a requisition was put in for a 10-lb. can of Dixon's Graphite.

When the graphite arrived the superintendent brought it in to me and made the remark that it was "very expensive stuff," and I told him that long before the summer was over he would have his money back again ten times over.

The Sunday following the arrival of the graphite we re-babbited this bearing, and I used about 2 oz. of graphite with my grease, and started up that night—the plant ran night and day, and this week, for the first time, we ran through without a single stop. I continued the use of graphite on this bearing and never afterward found it warm.

About two months after this the superintendent asked me to get graphite on all the bearings possible, as that was the cheapest lubricant we had ever used, for beginning with the use of graphite we did not use as much oil and grease in one month as we had used in one week prior to this.

About two years ago I had charge of a 150 H. P. engine that had been in use nineteen years. In all this time I was told that the cylinder had never been rebored, and the cylinder head had never been removed but on one or two occasions.

Desirous of knowing the condition of this cylinder, I removed the head and made an examination, and in all my experience I do not think I ever saw a cylinder to equal it—it more resembled a mirror than anything else. Graphite had been used on this engine from its start.

I could give dozens of instances where I have cut my lubricating expenses one-half, and secured better results by the use of Dixon's Flake Graphite.

The difficulty that engineers in many large plants have is to get graphite. A requisition from the engineer has to pass through so much red tape that it never reaches the

buyers's desk, and I have known engineers to buy and pay for it themselves after repeated efforts to get it through their house.

It is a mistake for any concern to ignore entirely the advice of their engineer. If he is at all competent to have charge of their plant in a mechanical way he knows exactly what he wants, and if it comes to the point where they think he is asking for something that is not required it only naturally leads him to think that they consider him incompetent, and under these circumstances he should resign.

DIXON'S ETERNO PENCIL AS AN INK-MAKER.

Mr. Paul Potter, photographer, Stamford, Conn., writes us a very interesting letter concerning Dixon's Eterno Pencil. We have seen many letters written with a Dixon Eterno Pencil, but have never seen a clearer or more-like-ink letter than the one which Mr. Potter sends us.

Mr. Potter says, "I think I have discovered two points that will bring a demand for this pencil:

First—For numbering negatives, until I tried a Dixon Eterno Pencil, it had been impossible for me to find a pencil that the different chemical baths would not remove the marks of. This is something that all photographers need.

Second—The lead of one Eterno pencil dissolved in half a pint of water makes an A No. 1 ink. It does not corrode the pens, and water will not remove the writing, as I have held a freshly-written sheet under the faucet for five minutes, and could see no change. The cost is less than 20 cents per quart, as the stumps of the pencils can be used to make the ink."

AMERICA AND EUROPE CONTRASTED.

The personnel of the staffs of the industrial concerns of Europe, broadly speaking, may be said to be national for each country. In America, in the larger concerns, on a similar staff, are found associated men of many nationalities, working harmoniously. Europe is not generally an expert in creating a market; America, on the contrary, is. In Europe, once the market is made, they take care of it admirably. This America does not do so well. America is careless in the use of raw materials, because generally raw materials are cheap. In Europe the reverse is the case, because raw materials are dear. In America the highest efficiency is obtained from labor, because labor is dear; in Europe, the reverse. In America the value of products for the wage earner is \$2,450; in Europe it will not average over \$500.—W. J. CLARK, from *Engineering Magazine*.

GRAPHITE FOR RUBBER GASKETS.

The Chief Engineer of a large manufactory in Troy, N. Y., writes us that he has a pressed rubber gasket on which he uses Dixon's Flake Graphite. This gasket has been in use for three years to his knowledge, and it is taken off every month. The gasket is still in good condition, and the chief engineer writes that if it were not for Dixon's Flake Graphite, a new gasket would have to be used every time the gasket is removed. In other words, a new gasket would be required every month, whereas one gasket has been in use for thirty-six months at least.

OUR LONDON PAGE

All Communications, Inquiries, Etc., relating to this Page should be addressed to Joseph Dixon Crucible Co. (Geo. W. Wollaston, Mgr.), 26 Victoria St., S. W., London.

MR. WALKER PAYS A VISIT TO JOHN BULL.

By the time these lines are in print, our honoured Vice-President and General Manager—John A. Walker, Esq.—will no doubt be with us here in London.

There are several matters which bring him over. One of least importance, perhaps, but not the least interesting is—his search for a real, thorough, old-fashioned London fog! So we have sent up a special Marconigram to the Clerk of the Weather, asking him to kindly oblige with the "London particular"; and we are all hoping to gratify Mr. Walker's curiosity during his present visit, since he is coming at the right time.

Welcome to old England, sir!



MESSRS. YOUNGER'S MALTINGS, EDINBURGH.

250 gallons of Dixon's No. 2 Silica-Graphite Paint were used for preserving the constructional ironwork of this building.

CHAIN LUBRICATION.

Mr. J. H. Boam, our esteemed Leicester agent, writes us that he has introduced our Motor Chain Compound to several collieries in his district, and that it has been tested on the chains of Coal Cutters with most excellent results.

Previously, these people could not get anything to lubricate the chains efficiently.

Our Motor Chain Compound was mentioned in last month's GRAPHITE. It is a mixture of Dixon's Graphite with neutral animal and mineral lubricants, and is molded into hard, oblong cakes. These are melted down and the chain thoroughly immersed therein. With this treatment motor chains are thoroughly lubricated and protected for 3 months with the one application.

There is no doubt, we think, that our Compound is an ideal coating for all sorts of chains besides those of motor cars. Our Leicester agent's experiments corroborate this. Considerable orders have been placed with him for use on the chains of coal cutters, and users are delighted with the Compound.

We suggest other experiments. Samples free.

YACHT PAINT. WHAT PAINT? DIXON'S SILICA-GRAPHITE PAINT.

GLASGOW, Aug. 16, 1904.

The Joseph Dixon Crucible Co.

GENTLEMEN:—Last December we supplied the S. Y. "North Star," owned by Cornelius Vanderbilt, Esq., of New York, with a few gallons of Silica-Graphite Paint (red), which was applied in the fore peak of that vessel as a test. The vessel has been in commission till the middle of July, and is now at Sandbank. The Capt. ordered some more Silica-Graphite Paint yesterday, and informs us he has never had like results from any other paint, and has instructed that it be applied throughout in bilges, etc. The paint work in fore peak is as good as when put on, no rust being visible.

Yours faithfully,

FERGUSON & TIMPSON.

GRAPHITE IN WAR.

Graphite plays many parts, chiefly, we are glad to say, in the arts of peace and commerce. But it also has its place in the bombast of war. We are reminded of this by an urgent order from Russia—a large firm of ammunition and war equipment manufacturers there. We also have regular correspondents in the Yokohama Dockyard, to whom we send copies of this periodical; and we believe supplies of our graphite are ordered through the Eastern merchants. So that we are quite impartial in our dealings with the Far Eastern belligerents.

Qualities of Dixon's Graphite, used for glazing the powder, are found in all the principal gunpowder mills in Great Britain and Germany.

THE MAN FRA' SHEFFIELD

knows a good thing when he sees—and tests—it. He has tested Dixon's Silica-Graphite Paint, and now it's coating, beautifying and protecting the pavilion in which he sits and watches his beloved cricket and footba'.

Other Clubs, take pattern by "the Blades'!" Paint up now! Use Dixon's!

Dixon's Flake Graphite saves time, oil and trouble.

Graphite

VOL. VI.

DECEMBER, 1904.

No. 13.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

COPY FREE ON REQUEST.

COPYRIGHTED BY THE JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J., U. S. A.

THE MERIT OF QUALITY.

A Foreign Ministry, in considering the solicitation of a contractor for an extension of three years in his contract for supplying the Royal Mint with Dixon's Plumbago Crucibles, decided in favor of the contractor for two reasons:

First, for the convenience of the Administration.

Second, because, during the two and a half years the contract had been running, the high quality of Dixon's Crucibles had made it unnecessary to use more than one-tenth of the number of crucibles that the contractor had been given to understand would be required.

The quality of Dixon's Plumbago Crucibles is the element which makes them distinct from any other plumbago crucible. It is this quality which has

made them the standard for seventy-seven years.

The value and worth of the Dixon Crucible is known and acknowledged throughout the entire world.

THE WARFARE OF BUSINESS.

Business is warfare. It's a hard, constant fight to the finish. The moment a contestant enters the field of commerce he is challenged by a host of competitors. All his movements are disputed and opposed by those already in possession of the field. He must fight to live. He must conquer to succeed. So it is that a man of business is like a soldier of the regiment. And like the well-trained soldier who delights in the clamor of battle, the enterprising business man is eager for the struggle of competition. He likes the excitement of contending for supremacy. He delights to overcome those who oppose him and he finds genuine pleasure in outwitting his rivals. It is this spirit of rivalry that sharpens a man's intellect and spurs on his energy. And unless a man is possessed of this desire to overcome, to surpass, to stand first in his line, he can never hope to carry the day, he will never succeed in the fight.

Profit, which is the reward of industry and ability in business, is not the sole object and consideration that actuates the really successful man. The love of gain cannot in-

spire him to the highest endeavor. There must be something greater, something more enduring to call forth his supreme efforts and satisfy his ambition. And that is something in the same spirit that is possessed by the men of war who go into battle to do or die—who fight to win and forget all else.—S. W. P. in *Stoves and Hardware Reporter*.

THE WIND AROUND THE EAVES.

I love to watch the billows leap
And see their white foam pour,
As they break upon the shining sands
That girts old ocean's shore,
And I love to list' the wind that weaves
Its eerie song around the eaves.

It brings the scent of new mown hay
The odor of pines from far off hills,
It comes from the woods where mosses gray
Cling to the rocks among twinkling rills,
And its cool breath stirs the ivy leaves
As it winds its way around the eaves.

When winter comes with sleet and rain
Round rayless suns and sullen skies,
When frost lies thick upon the pane,
I lie 'till sleep shuts down my eyes,
And listen to the wind that grieves,
And sobbing creeps around the eaves.

—Lucy M. Stocking in *St. John's Bulletin*.

AN EVERLASTING PENCIL.

A man called at the Philadelphia branch of the Dixon Company and said he didn't see how the Dixon Company could make money on the sales of the Dixon "Eterno" pencil. He said he had had one for three months, and had used it on paper, wood, and had even marked on stone with it, and yet it is not one-third used.

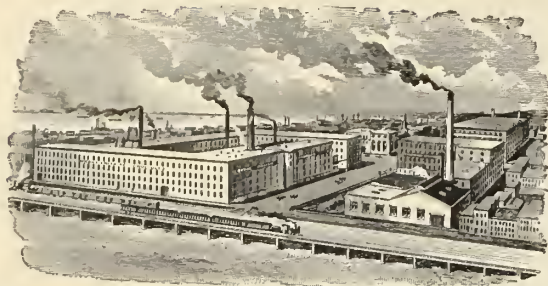
BIG, AIN'T IT?

In July, 1904, traffic through the canals of the Soo was nearly six million tons for the month. This is twelve thousand million pounds per month, and is four hundred million pounds each day. Stop a moment and think it out. Four hundred million pounds of freight through this one channel every day, sixteen and one-half million pounds every hour, nearly three million pounds every minute, about forty-five thousand pounds every heart beat.

—J. A. WALKER.

ESTABLISHED 1827.

INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

BRANCHES AT

68 Reade St., New-York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Pittsburg, Paris, Hamburg, Vienna,
Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen,
Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, JOHN A. WALKER, GEO. E. LONG,
President. Vice Pres. and Treas. Secretary.

JERSEY CITY, N. J., December, 1904.

DIXON'S GRAPHITE AXLE GREASE.

Of the eighty millions of people in the United States few have ever heard of Dixon's Graphite Axle Grease.

There are, however, many users of this Axle Grease, and those who use it could not be pulled away from its use by an ox team.

Dixon's Graphite Axle Grease is known and used from Maine to California.

Mr. C. E. Stevens of Readfield, Me., says: "One dollar's worth of Dixon's Grease runs my 19 carriages and wagons two years, and keeps the boxes and spindles in the best of shape. Do you wonder that I like it?"

Mr. Charles B. Mullaly, President of the Carter-Mullaly Transfer Company, San Antonio, Texas, wrote us in December, 1903: "I bought a half barrel of Dixon's Everlasting Graphite Axle Grease, and still have plenty on hand. Dixon's Graphite Axle Grease, besides being cheaper than anything else we have ever tried, is the finest grease and it keeps our rigs in the best of shape. You can draw upon us for the strongest possible recommendation for Dixon's Graphite Axle Grease."

The Captain of an Engine Company of the Fire Department, of one of the large cities, says: "June 25th, 1903, I applied Dixon's Graphite Axle Grease to the axles of our engine, and after 15 weeks, during which time we responded to 30 alarms, I examined the axles and found them in fine condition, and not needing any attention.

Four weeks after that, and after answering 18 more alarms, we made another examination, and found the axles in still the same excellent condition. Our engine weighs 5,600 pounds."

A Doctor writes us: "For many years I have used Dixon's Everlasting Graphite Axle Grease with a degree of satisfaction never attained by any other lubricant. My supply being nearly exhausted, will you kindly send me by American Express a half dozen one pound cans. This of course is not all for my own use; I would require an extension to my life's tenure before using it; I will dispose of part of it to another party."

A dealer in wagons, carriages, etc., says: I have used Dixon's Everlasting Graphite Axle Grease for 20 years, and have found nothing to equal it. I want an axle grease in which I can have confidence, and know that the wheels of my wagons will not stop before my customers get home."

Dixon's Graphite Axle Grease is equally useful for the heaviest trucks and the lightest wagons. It protects the bearings from rust and does not clog in cold weather. Any of our readers who are not familiar with this axle grease, and who would like to know about the most economical axle grease ever used, may receive a sample and descriptive circular on request.

DIXON'S GRAPHITE FACINGS FOR RADIATORS.

We have much pleasure in publishing, with permission, the following letter:

THE J. H. McLAIN COMPANY,

MANUFACTURERS OF

HOT WATER AND STEAM HEATERS,

RADIATORS AND SUPPLIES.

CANTON, Ohio, July 16, 1904.

The Jos. Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN:—"In answer to your inquiry as to how your Plumbago is suiting us, we are pleased to say, we had been using several grades prior to yours, and in one department particularly, the Radiator Department, we had been having considerable trouble with the iron cutting through the facing and making rough castings.

Since using the special facing you sent us, which costs us four and a half cents (4½c.) per pound, as against a price of one and three-fourths cents (1¾c.) which we used to pay, your Facing is saving us a great deal of money, at the price, and we can only say we expect to continue it, on its good merits."

Yours very truly,

THE J. H. McLAIN COMPANY,

P. L. McLAIN,

Sec'y and Treas.

DIXON'S STENOGRAPHER PENCIL.

The Principal of a State Normal School wrote as follows:

"Please send us six (6) dozen of Dixon's Stenographer Pencils, No. 489. We have tried many varieties of pencils for shorthand work, and we find that Dixon's No. 489 is the finest pencil for the purpose we have ever used."

THE PROPER ANNEALING OF CRUCIBLES.

CHICAGO, Aug. 17, 1904.

Too much importance cannot be attached to the proper care of crucibles after they are received at the brass foundry. Once in a long while we have a man write us something as follows: "The last shipment of crucibles received from you is defective. Some of them break even before we get them into the fire, and others flake off in the first heat." This is what is technically termed "a scalp," and no matter how much care the manufacturer gives to *his* work, unless the pot is properly annealed, or seasoned, this scalping is liable to occur. The cause of it is moisture which enters the walls of the crucible, sometimes clear to the center, while the goods are in transit. A leaky freight car and a rainy day are sufficient to cause the trouble. It is also to be remembered that a crucible gathers moisture the same as a bucket of salt. Everybody knows that in muggy weather the salt won't come out of the shaker, although it is inside the house and in what might be termed a dry place. The putting of crucibles in a dry place, however, may not be sufficient to prevent their scalping.

The average brass founder opens the cask when it comes in and puts the crucibles on the back of the furnace, and after a week or ten days starts in to use them, without other annealing. He places the pot mouth down on a slow fire in the morning, and if one of them happens to scalp, the *crucible* is blamed.

We would suggest to our friends that a more severe annealing than this will not only prevent the scalping absolutely, but will also increase the life of the crucible, and although it is a little bother and it will take some time to properly anneal crucibles, it will pay in the long run.

If the brass shops were equipped with an oven in which they could put the crucibles and bring the heat up slowly and gradually from nothing to a red heat, the annealing could be done in two or three days, but the average foundry is not so equipped.

We offer the following suggestions, which will be found perfectly expedient in every brass foundry:

First—Unpack the crucibles and place as many of them as possible on the flues back of the furnace. Here they will be heated to a sufficient degree so that they cannot be handled without burning the fingers. They should be left in this position from one to three weeks.

Second—At night, after the fires are drawn from the furnace, and the furnace is allowed to cool for, say, fifteen minutes, open the furnace wide, lay a shank across the top, place a crucible on the shank (mouth down) over the center of the furnace so that the remaining heat in the furnace will come up during the night and strike not only the inside but also the outside of the crucible. Repeat this three or four times.

Third—Draw the fires as before, allow the furnace to cool twenty to twenty-five minutes, place the pot (mouth down) on the grate bars of the furnace, allow it to remain all night. Repeat this the second night, only giving the furnace ten or fifteen minutes to cool off. Repeat again the third night, and this time leave the cover on the furnace.

By this method a crucible will be brought up to a red

heat slowly and gradually, and whatever moisture may have been within the walls will be expelled without any steam. It is the expansion of the moisture and the generation of steam which blows a piece, or flakes off the pot.

Some foundrymen will say that so much annealing is unnecessary; that they have followed a different practice for twenty years and have had very little trouble. The answer to this is: Scalps are not of frequent occurrence, and it might be a year or two between troubles of this kind, but when they *do* occur they are expensive. It is not every shipment that gathers moisture. We have seen crucibles taken out of the cask and immediately put into the fire without detrimental results, but the user is assuming considerable risk in so doing.

As an evidence that this "flaking off" is caused by moisture, we would say: Nobody ever saw a crucible scalp after it had safely gone the first heat, which is proof positive that the bringing of the crucible up to the heat necessary to melt brass, expels from it *all* the moisture, consequently after the *first* heat there is no danger of a scalp.

DUDLEY A. JOHNSON.

GRAPHITE FOR THREADED JOINTS.

If all threaded joints, not only all piping connections, but also bolts, nuts, etc., were screwed up with a little graphite on the threads, instead of painting them with red or white lead or other cements, more satisfactory results would be obtained. Graphite, especially flake graphite, is a lubricant that enables a closer, tighter joint to be made with ease. Graphite is a chemically inert substance and not affected by heat, cold, gases, acids or alkalies, and its smoothness allows it to be thinly spread over the threads, filling every crack and pore. This layer remains between the threads indefinitely, and when it is desired to break the joint only a very moderate effort is required, as compared with joints which have rusted or are filled with hardened lubricant. Joints screwed up with graphite cannot corrode or set, so that even years after they can be easily taken apart without damage to tools or fittings. The very best form of graphite for pipe fitting, as far as we know, is Dixon's Graphite Pipe Joint Compound, an article which has been tried and proved for over twenty years. The makers, the Joseph Dixon Crucible Company, of Jersey City, N. J., will gladly send all interested a copy of a neat descriptive booklet and a free sample of Dixon's Graphite Pipe Joint Compound.—*Progressive Age*.

DIXON'S PENCILS AND CRAYONS WITHOUT A PEER.

WALLACETON, Ky., Aug. 17, 1904.

Messrs. Joseph Dixon Crucible Co.,
Jersey City, N. J.

My Dear Sirs:—Kindly accept many thanks for the generous supply of materials and prompt attention given my request. Your pencils and crayons stand without a peer, and are suitable for all kinds of expressive work from the Kindergarten to University.

Very kindly yours,

EMMA J. HAAGEN,

Supervisor of Drawing.

A GOOD STORY.

The Journalist prints the following in an after-dinner speech of Mr. Conne, of the International Advertising Association:

Mr. Conne said that the representative of a Hebrew paper called upon him not long ago soliciting an advertisement. It seems that the polite circulation of a Hebrew journal is sixty thousand; more is looked upon with incredulity by the advertiser, and less fails to reach the proper limit. After the solicitor had unfolded his tale, Mr. Conne said:

"What is your circulation?"

"Sixty thousand copies."

"Sixty thousand every week?"

"Yes; sixty thousand copies every week, 's help me Moses!"

"Will you guarantee me sixty thousand copies?"

"I gife you my sacred vord of honor dot ve circulate sixty t'ousand copies efery veek."

"Will you make an affidavit to that effect?"

"Sure."

"I'll bet you fifty dollars to five you can't prove it."

"Vell, I vouldn't like to bet money on a t'ing like dot."

INITIATIVE.

Elbert Hubbard says: "The world bestows its big prizes, both in money and honors for but one thing, and that is Initiative."

"Initiative," he says, "is doing the right thing without being told, but next to doing the thing without being told, is to do it when you are told once. There are those who never do a thing until they are told twice. Again there are those who do the right thing only when necessity kicks them from behind. This kind spends most of its time polishing a bench with a hard-luck story. Then, still lower down in the scale, we have the fellow who will not do the right thing even when someone goes along to show him how, and stays to see that he does it; he is always out of a job and receives the contempt he deserves, unless he has a rich Pa, in which case Destiny patiently awaits around the corner with a stuffed club. To which class do you belong?"

THERE slipped out the other day from a bunch of old papers, the following order for Dixon's Crucibles:

DORCHESTER, Mass., June 3, 1851.

Messrs. Joseph Dixon & Co.

GENTLEMEN:—I am now in want of another lot of crucibles. I am using a good many of them, and you may send me by Fall River route, the following:

3 barrels No. 18.

1 barrel No. 20.

1 " No. 25.

Send any time within eight or ten days, and I will remit.

Respectfully,

(Signed), ROSWELL GLEASON.

If the active and energetic readers of GRAPHITE will indulge in a little retrospection, they will be much better able to grasp what fifty-four years ago means.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, type-writer work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

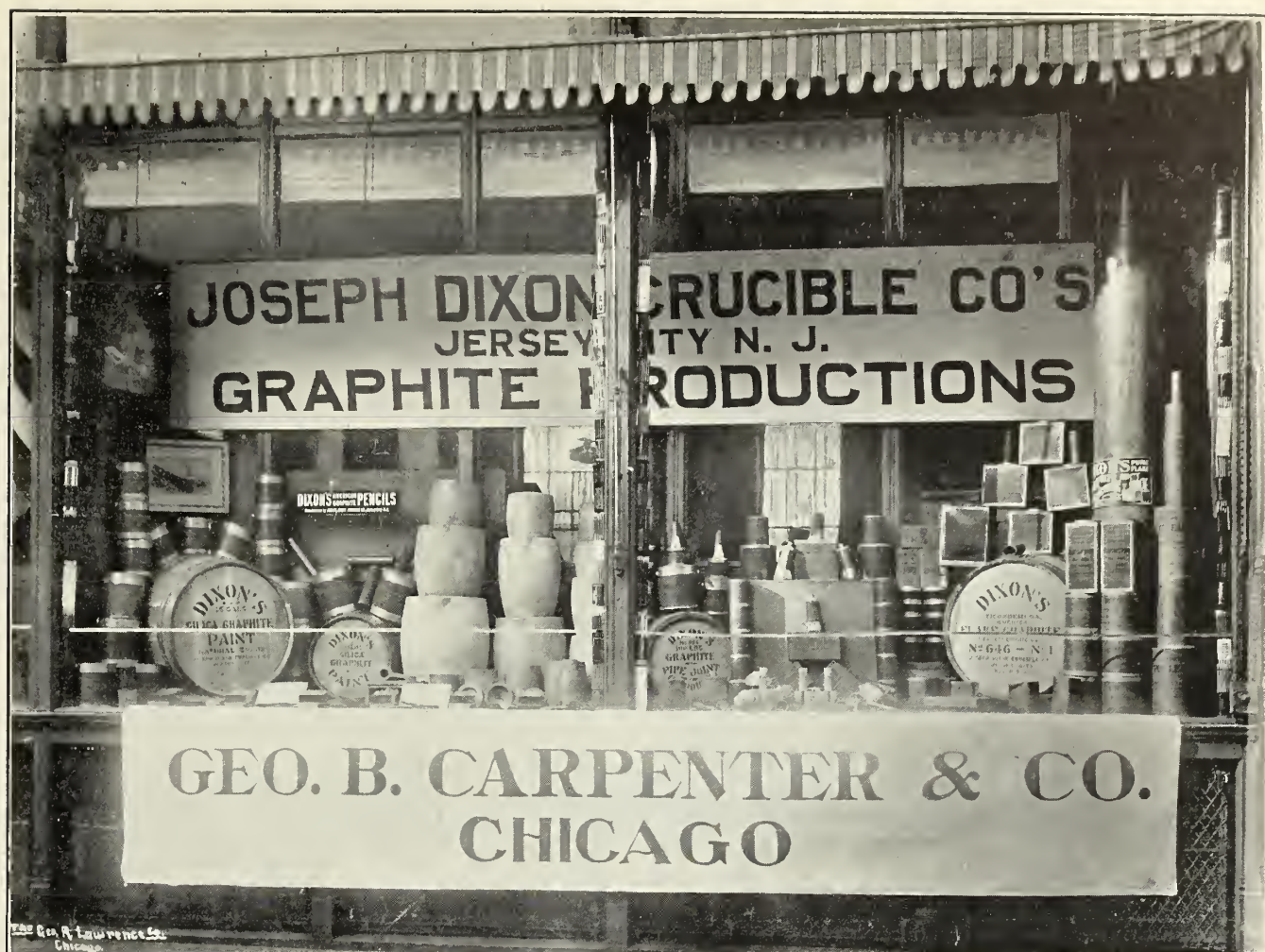
Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.



The above picture is very pleasing, in showing, as it does, the interest that dealers take in Dixon's graphite products.

Messrs. Geo. B. Carpenter & Co., the large and widely-known firm of ship chandlers, jobbers and mill agents, have made a most attractive window display of the line of Dixon's graphite products carried by them.

So unique is this display, made up, as it is, of Dixon's many grades and kinds of lead pencils, graphite axle grease, belt dressings, plumbago crucibles, Ticonderoga flake graphite, graphite greases, automobile lubricants, graphite lubricants for general and special purposes, graphite paint for protection of metal surfaces, special graphites for the sportsman and the yachtsman, graphite specialties for electricians, stove polish for the housewife, and graphite materials for the foundryman, the steamfitter, and the engineer, that the passersby seem never to weary in looking at the display, and are lost in wonder when told that there is not an industry in the civilized world, or man, woman or child, that does not use graphite in some one of the many forms, and that the Dixon Company is not only the largest, but the only one of the kind in the world.

CASTING ALUMINUM.

The matter of casting aluminum for pattern work is assuming such prominence, that a little general information on this subject will not come amiss. It is important to make the mold suited to the casting. For instance, a plain bar can be molded up as hard as may be, and if well

vented, will come out perfect. On the other hand, a thin ring, unless molded up soft enough to allow the metal to compress it, will be sure to tear apart. Hence, wherever the metal is to enclose the sand, this must be left as soft as possible, to allow for compression during the cooling of the casting.

Ram the sand as little as possible, use as dry as possible, vent freely, and you are pretty safe. Aluminum is quite brittle at the critical temperature, hence the least strain at that time injures it. Cores should be soft, and coated with graphite. The sand should be new, and while no facing is necessary, a good dusting with soapstone can be recommended. The slicking tool should never be used on a mold.

Melt the aluminum in a plumbago crucible, previously rubbed up with graphite. When the metal is melted, it should be poured at once. Gates should be wide, and of a generous area. Big feeder heads are not advisable, as they do not feed, but rather draw away the metal from the casting. The metal should not be too hot, a good claret color is sufficient, when observed by putting aside the skin with a stick. Fluxes are unnecessary; occasionally, however, cryolite may be used to advantage. All sodium salts should be kept away. Zinc can be added, though the metal should not then be sold as an aluminum casting. Up to fifteen per cent. can be used safely. Tin should also not be added to the aluminum.—*The Mechanical World.*

GRAPHITE FOR LUBRICANTS AND PIPE JOINTS.

The Joseph Dixon Crucible Company, of Jersey City, N. J., U. S. A., has made wonderful progress in the development of uses for graphite, which, under its impetus, has become an important feature of commerce, both domestic and foreign. It has demonstrated that flake graphite, when properly mixed with greases, is an invaluable ingredient for enhancing the lubricating power of the grease. It has manufactured for some time, and placed on the market, Dixon's Graphite Cup Grease, which it claims



to be the most effective lubricant known, and a package of which is here shown in an illustration.

Experiment and experience have shown that the addition of pure flake graphite to oils or greases increases their efficiency and endurance as lubricants. It enables the oil or grease to do heavier duty, and, with addition of this ingredient, a thinner, less viscous oil or grease may be used with perfectly satisfactory results. The graphite fills up low spots and scratches through the grain of the metallic surfaces of the machine to which it is applied, forming thereby a perfectly even, tough glaze, of exceeding smoothness on the rubbing surfaces, and reducing the necessity for more than a relatively small quantity of oil or grease. Cutting of a bearing surface thus coated is impossible, and there is a great reduction in the natural tendency of bearings either to warm up or overheat.



Dixon's Graphite Cup Greases are made in six degrees of hardness, from the consistency of soft vaseline to that of tallow, but with somewhat more cohesiveness. The softer grades are for use in the lubrication of light, high speed spindles, and may be fed by means of compression cups, or in open bearings. The harder grades are suitable for work more severe, so far as pressure is concerned. They are

excellent marine lubricants, assuring cool and smooth operation of thrust, tunnel shaft, and main bearings, as well as auxiliaries.

Another field in which the use of graphite has proved most advantageous is the fitting of pipe joints. When oil is used alone to facilitate the work, the joint can be screwed up without trouble, and, for a time, will remain perfectly tight, but not permanently so. As the oil is burned out or otherwise destroyed, rust rapidly works in between the threads of the screw, and a rust joint forms. If the joints are screwed up with graphite on the threads, the graphite will be thoroughly distributed over the surfaces, filling in all the smallest chinks and pores in the metal, and forming a good, smooth and impervious coating of lubricant and rust-preventive that enables the joint to be opened many years after it has been closed. The best form of graphite for pipefitting purposes is Dixon's Graphite Pipe Joint Compound. It has been in process of manufacture for more than a quarter of a century, and has stood the test of time.—*Exporters and Importers Journal*.

AN ELECTROLYTIC ANTI-FRICTION METAL.

We are often asked concerning anti-friction metals said to contain graphite. So far we have found none that have contained any visible graphite. The one described in the following, which we reprint from the *Electrical Review*, seems to be one made on an entirely new plan:

Metallic compositions containing graphite, and intended for anti-friction metals, are produced in a number of ways. A greater number of these, says Herr Josef Rieder, contain, in addition to the graphite and the metal, other materials which are objectionable. These are generally added in the form of binders, and are such substances as water-glass, lime, asbestos powder, etc. The use of such materials is not necessary if the metal itself may be made to bind the graphite. A method devised by the author consists in depositing electrolytically in a suitable mould copper or any other desirable metal over the graphite particles. The moulds, which must be of non-conducting material, are constructed of plaster of paris, saturated with paraffine.

The surface of the mould is coated with graphite to render it conducting, and over this is placed a layer of graphite particles about the size and having the irregular form of No. 30 carborundum. This layer is conveniently made by means of a fine sieve or floated over on alcohol. The electrolyte is the ordinary acid solution of copper sulphate. The anode of the metal to be used and the current density must not be too great, or the deposit will be porous. As soon as sufficient copper has been deposited to hold the graphite particles firmly, a second layer of graphite should

be made, and the process continued until the desired thickness is obtained. This material is thought to be very suitable for dynamo brushes. It should not be much more expensive than ordinary electrolytic copper. It is also thought to be suitable for packing rings, as it is not affected by very high temperatures.—*Translated and abstracted from the Elektrotechnischer Anzeiger (Berlin)*.

PROPERTIES OF GRAPHITE.

Graphite is one of the purest forms in which carbon occurs in nature. It possesses a bright lustre and is very smooth and soft. It is unaffected by heat or cold and is not acted upon by acids or alkalies. It has a strong attraction for the metals and when rubbed on them forms a surface of great smoothness. As all bearings are more or less rough, the advantages of graphite as a lubricant lie in the fact that it fills up these small uneven places and makes them smooth and mirrorlike, so that when oil or grease is used, it relieves them of this service which they would otherwise have to perform, making lubrication more effective and increasing the wearing qualities of the oil. When used in cylinders of steam engines, either alone or with oils, it tends to polish both the valve seat and the interior of the cylinder. It is especially valuable when high temperatures are encountered, as in the cylinder of a gas engine, where temperatures as high as 3000° F. are met with. It can be fed into the cylinder of an engine in the usual way or by means of a hand pump, several times a day. Force feed lubricators offer the best means of insuring a steady, closely regulated supply of graphite, mixed with oil or water, to either cylinders or bearings. When mixed with grease it can readily be used in any compression grease cup.—*Practical Engineer.*

THE OWNER OF THE PENCIL.

They were two pretty girls, modest in their demeanor, but alive to their surroundings. The two young men had noticed them on the platform, and on the train had secured seats just behind them. The girls had in no way encouraged these attentions, and yet they could not be unconscious of them.

The young men held a whispered consultation, and then leaning across the aisle one of them requested the loan of a pencil from an elderly man sitting there. With sly smiles toward the seat in front a note was written, the pair collaborating. There was evident intent of dropping this note into the lap of one of the girls; but the man whose pencil had been borrowed interposed quietly but firmly.

"Permit me to read the note first," he said with the utmost politeness. "I make that an inviolable rule with my daughters' correspondence with young men."

An instant later there were two vacant seats, and on the platform two young men waited, red and impatient, for the first station.—*N. Y. Tribune.*

My son, the world is dark with griefs and graves,
So dark that men cry out against the heavens.
Who knows but that the darkness is in man?
The doors of Night may be the gates of Light;
For wert thou born or blind or deaf, and then
Suddenly heal'd, how wouldst thou glory in all
The splendours and the voices of the world!
And we, the poor earth's dying race, and yet
No phantoms, watching from a phantom shore,
Await the last and largest sense to make
The phantom walls of this illusion fade,
And show us that the world is wholly fair.

—*Tennyson.*

THE JAPANESE PROVERB.

"Roses have thorns" and "Walls have ears" are as common in the Japanese speech as in our own. We say "More haste, less speed," but the Japanese phrase is, "If in a hurry go round." In this country we very often remark that "Accidents will happen in the best regulated families. The Japs, on the other hand, with an eye to the picturesque, vitalize it, so to speak, in their "Even a monkey sometimes falls from a tree." One of our useful English sayings is, "Those who play with edged tools must expect to cut their fingers." In expressing a similar thought the Jap goes us one better so far as picturesqueness is concerned. He says, "If you keep tigers you are likely to have trouble." One of our standard maxims is to the effect that "Oil and water won't mix." The Japs have not improved on this. "You can't rivet a nail in a custard" is their way of putting it. "The lotus springs from the mud" is their poetical expression of the common thought that "Out of evil good may come."

What could be more suggestive and at the same time so poetic as their "Scattering a fog with a fan?" When a Jap undertakes the impossible his neighbors do not scoff at him or mock him. They simply say that he is "Building bridges to the clouds" or that he is "Dipping up the ocean with a shell." Failure in such a country must be as delightful as success in our more material land. "Thine own heart makes the world" is worthy of Emerson or Browning.—*Ourselves.*

GRAPHITE SUGGESTIONS.

Possibly no other substance is so wonderfully diverse in its application as graphite. In almost every possible calling, in all parts of the world, graphite is used in some form. The savage who has learned to handle a firearm uses it, for his powder has been at least partially made by graphite. His forefather used it in his war paints. In distant Japan graphite serves as a harmless coloring agent, for it gives to certain grades of tea their uniformity of color. In South America coffee is polished with it. Electricians, chemists number it among their serviceable materials. It is also used by printers, hatters, engineers, housewives—in a word, everybody uses it, consciously or unconsciously. "Graphite Suggestions" is the title of a publication which presents most interesting facts concerning graphite products. It is issued by the Joseph Dixon Crucible Co. of Jersey City, N. J., and copies are obtainable on application. For more than three-quarters of a century the Dixon Company has manufactured graphite in innumerable forms. It works its own mines besides. This experience of decades is embodied in a quality which has been imparted to Dixon products and renders their use safe and profitable. The company's book is not a catalogue, but an interesting treatise on a substance which has so many and so peculiar properties that no other single substance, it is stated, can possibly perform the same functions.

—*Manufacturers' Record.*

OUR LONDON PAGE.

This month we are obliged to go to press without our London page, as copy failed to reach us in time.

LO, THE POOR HEATHEN!

[Tacoma, Wash.—H. F. Krohnskyn, of Seoul, Corea, is on his way to New York and Philadelphia to contract for idols to be used in the temples of his country as well as in China. He is sent by a wholesale firm, and has models with him. He says that a few years ago an American firm sent a few idols as a gift to one of the sacred orders, and a demand for them has resulted.]

"The heathen in his blindness
 Bows down to wood and stone"—
 Some idol inexpensive
 He puts upon a throne:
 But now we'll teach the heathen
 The error of his way,
 And sell him modern idols
 Made in the U. S. A.

We'll lift the foolish heathen
 From groping in the dust,
 And change and civilize him—
 We'll form an Idol Trust.
 For ages he has grovelled
 In superstition dim,
 But now we'll help his progress
 By making gods for him.

No seven-handed figures;
 No gods with coiling tails;
 No birds, no bugs, no serpents,
 No animals, nor whales—
 No, sir! He'll have our idols;
 A shovelful of coal,
 A meter, and an oil can
 To terrify his soul.

A bonnet and a ribbon;
 A bargain ad.—the strife
 They'll cause will make the heathen
 Yearn for a better life.
 The poor, benighted pagan
 Will come out of the dark
 And bow before our idol—
 The mighty dollar mark!

—*Chicago Tribune.*

DIXON'S PIPE JOINT COMPOUND.

In Underground Use.

We have a letter from one of our customers in New York State, advising us that in July, 1901—over three years ago—they laid some pipes underground and used Dixon's Graphite Pipe Joint Compound on their threads.

Three weeks ago they had occasion to pull them up and take the joints apart, and "the joints came apart as easily as if made up yesterday."

Jones—"It is just impossible for me to keep a lead pencil. People are always borrowing, you know, and they always forget to return." Brown—"Why, I never have any trouble. See, I've got a whole vestpocketful of pencils." Jones—"Doesn't that prove just what I said?"

—*Boston Transcript.*

DIXON'S GRAPHITE PIPE COMPOUND.

The master car builder of an important railway company, whose name we are not permitted to publish, writes us as follows:

"We are still using Dixon's Graphite Pipe Joint Compound and we shall continue to use it until we find something better, but up to date we have still to find its equal."

DIXON'S GRAPHITE JOINT COMPOUND.

Fit for the fitter's most particular work is Dixon's Graphite Pipe Joint Compound. It insures the closest joints with the least trouble. It resists every form of corrosion, but does not resist a reasonable effort, if the necessity for separating joints or flanges arises.

It is a revelation to those who have been taught to use other forms of pipe compounds and cements.

MINERS, IMPORTERS, MANUFACTURERS.

The Joseph Dixon Crucible Company started the graphite industry in 1827, by manufacturing the first plumbago crucible ever made. To-day the company leads the world in the production of plumbago crucibles, foundry facings, protective paints, graphite lubricants. It is the largest concern of the kind in existence.

DIXON'S GRAPHITE AXLE GREASE.

Even if we are familiar with an article and are thoroughly satisfied with it, it is nevertheless pleasing to know what others may think of it. We therefore give the substance of two letters recently received by us concerning Dixon's Graphite Axle Grease:

"I have used Dixon's Graphite Axle Grease for ten years and have found it very good. It does not run like some other greases and I have never had a hot axle since using it."

"I have given Dixon's Graphite Axle Grease a good test and I believe it to be the best lubricant I have ever used on light wagons."

When it is remembered that Dixon's Graphite Axle Grease has, as its basis, the world-famous Ticonderoga Flake Graphite, and that only the best oils and greases are used in its composition, there is no reason why the axle grease should not have the reputation that it enjoys.

DIXON'S POTLEAD FOR TOBOGGANS.

We have lately had an order for a package of Dixon's Potlead, for use on the bottom of a racing toboggan, the order coming from Montreal, Canada.

As a matter of fact, Dixon's Potlead ought to be as good for eliminating friction in toboggan racing as it has been and is for reducing friction on the bottoms of racing yachts.

Anderson, Ind., Oct. 24, 1903.

This is to acknowledge your favor and an 'Eterno' pencil you sent me at Plainfield, Ind. I think the 'Eterno' is just grand. It fills the bill completely, is of convenient size, proper hardness of lead, and gives a perfect copy. I use them exclusively. Many thanks for your promptness.
 Jno. R. Moore.

UNDERLOADED ENGINES.

By W. H. WAKEMAN.

When I first read the statement that underloaded engines were not economical, I was very much inclined to doubt it. This was due to the fact that for several years I had run an engine that was sadly overloaded at times, making the speed unsteady, hence unsatisfactory, also causing much delay in doing the work because there was not power enough to carry it on properly.

Of course, it is better to have an engine just right for its load, but as that is not possible in all cases, one that is too large will result in less loss than if it were so small that uniform speed could not be maintained.

As a rule, when we speak of an economical, or of a wasteful engine, we refer to the amount of coal required per horse power per hour, and nothing more is taken into consideration. But this is only one point, yet it is very important, hence we will review it first.



FIG. 1.

The indicator diagram shown in Fig. 1 illustrates conditions that are found where an engine is larger than is actually necessary. The cut-off valve closes when the piston has traveled but a small part of the stroke, and as expansion begins at once, pressure is reduced to zero by the gauge at one-half stroke. Momentum of the fly wheel and other moving parts, carries the piston to the end of stroke, but pressure is further reduced until a respectable degree of vacuum is formed at the end of stroke. It would be much nearer a perfect vacuum if the steam did not continue to expand.

Under certain conditions the temperature of steam corresponds to its pressure, and change of pressure affects the temperature in all cases. In the case of a boiler where the pressure changes gradually, the steam gauge is a true indicator of the temperature, but the conditions are quite different in the cylinder of an engine, because the changes are made so much more rapidly. If we take an engine making 180 revolutions per minute, changes of pressure on each side of the piston occur three times every second. The diagram in Fig. 1 shows a change of, say 100 pounds between the initial and the terminal pressure, but these changes are made so rapidly that there is not time enough for the cylinder walls to cool and heat to temperatures corresponding to these pressures.

No matter how fast an engine runs, there is always time for the steam to be affected as follows: Again referring to Fig. 1, the pressure and temperature are high at the beginning of stroke, while both are low at the end of it, assuming that there is time enough allowed for the change of temperature. We know that its changes are considerable, therefore after this stroke is completed the piston reverses its motion and commences another stroke. Steam admitted

at this time comes in at a high pressure and temperature, but it strikes the cylinder walls, cylinder head, ports, &c., which are at a lower temperature, resulting in condensation of a portion of it in raising this temperature. As this is a dead loss of heat, it reduces the efficiency of engine, so that when we divide the pounds of water evaporated per hour by the horse power developed, the quotient is large, denoting a wasteful condition of affairs.

Fig. 2 illustrates a diagram from the same engine carry-

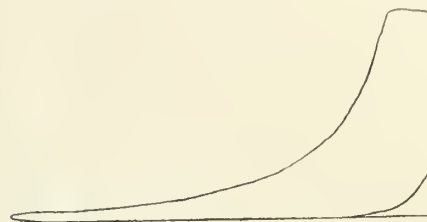


FIG. 2.

ing more load. The point of cut-off is now longer, making the terminal pressure higher, therefore the temperature at this point is higher, consequently when the next charge of steam comes in, less of it is condensed from this cause. The area of diagram is now larger, showing that more power is developed.

Calculating the theoretical water consumption from the terminal pressures, shows that more is required for Fig. 2 than for Fig. 1, but we would not be surprised if the amount actually evaporated by the boiler was about the same in both cases. As the power developed in Fig. 2 is greater, the divisor is larger when computing the theoretical rate of water consumption, or, in other words, the pounds of water evaporated per hour for each horse power developed, therefore the rate is lower, showing a more efficient engine.

As these lines are written I remember a case where an engine carried a medium load, which we will assume is fairly represented by Fig. 2. One of the tenants in that building moved away, causing the load on the engine to be reduced, so that it was probably represented by Fig. 1.

The owners mourned the loss of a good tenant, but expected to save coal by the change. They were much surprised, however, to find that their coal bill was fully as high as before. This instance is presented to illustrate the statements previously made.

Fig. 3 illustrates a diagram taken with a much heavier

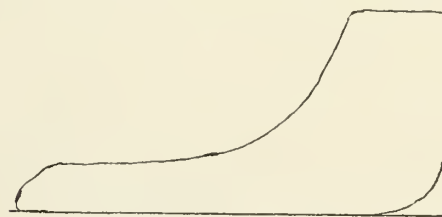


FIG. 3.

load, giving a higher terminal pressure, which reduces the difference between it and the initial pressure. Cylinder condensation due to conditions already described, is much less than before, and although the total water evaporated is more, the power developed is greater, making the rate less. If the load is increased much more, the efficiency will be reduced, because a very high terminal pressure results in

losing more heat than is saved by reduction of cylinder condensation.

Due consideration of the foregoing statements will make the matter of wastefulness of unloaded engines plain to those who have not already mastered the subject, but it does not show the loss caused by loading an engine until its speed is rendered unsteady.

Taking the case of a shop or factory filled with automatic machines for the manufacture of some staple article of commerce. All of these machines are expected to run at a certain speed, and all other details are arranged to correspond. A given output should thus be realized each day, but if the engine is so heavily loaded that the speed is reduced five per cent., while the running expenses remain exactly the same, the final result is a large loss. This loss may equal the entire cost of coal, so that while the substitution of a larger engine means less efficiency when the engine alone is considered, yet it makes a large saving when the whole plant is included.

the valve in exhaust pipe, were closed, and the machinery started by turning steam into the other cylinder.

Of course, the idle crank looked odd as it turned, but better results were secured, as a diagram from the working cylinder resembles Fig. 2, showing that the load is not heavy enough to lower the speed.

He used one cylinder for about three months, then laid that one off and used the other for a similar period. Moisture left in the steam chest and cylinder, caused the bright surface to rust. There were two steam chests on each cylinder, as shown in Fig. 4, in which were gridiron valves. The covers of these were removed until wanted, and all bright parts that are touched by steam when in use, were covered with Dixon's Flake Graphite, mixed with heavy cylinder oil.

This not only prevented rust and corrosion, but when the time arrived to start the idle cylinder, it was not necessary to remove any of the mixture, as it is a good lubricant, therefore it was only necessary to replace the steam chest

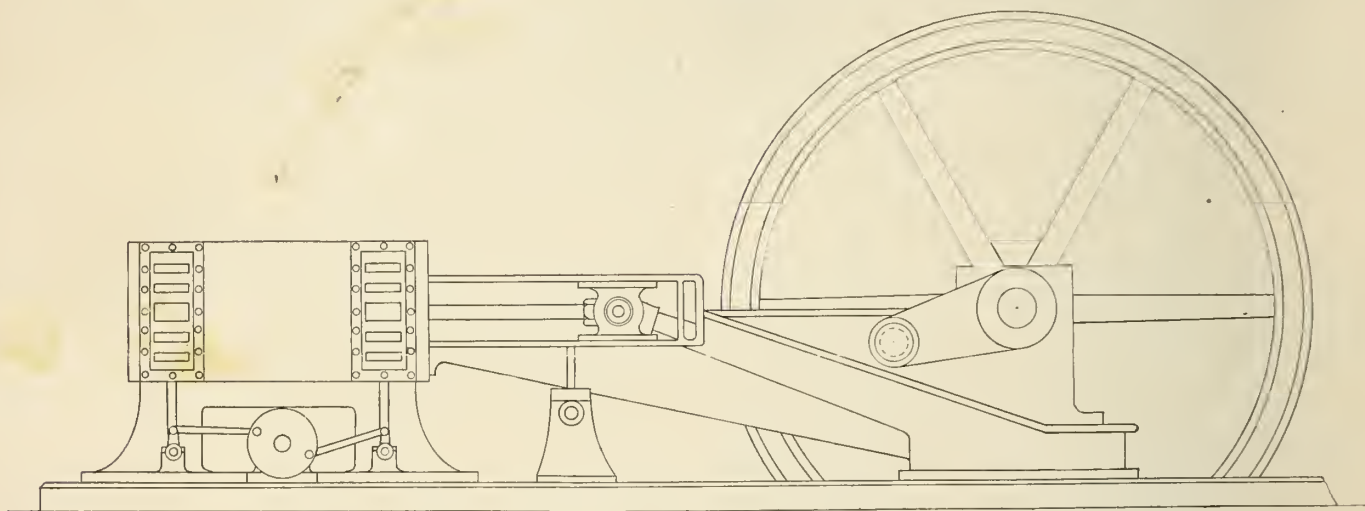


FIG. 4.

In the majority of cases where an engine is overloaded, the engineer can do but little to remedy the evil. He may find it possible to reduce the boiler pressure, (although this is not practical in all cases), but the limit is soon reached. Reducing the speed of engine will raise the terminal pressure and thus prove beneficial, but this makes it necessary to put on a smaller main pulley, or else increase the diameter of fly wheel, neither of which may be practical on account of other changes which would be required.

In a certain case that I remember an engineer had an excellent chance to make an improvement along this line, and he was not slow to take advantage of it. He took charge of a double engine, and found it underloaded. This does not mean a cross compound engine, but one in which both cylinders take steam directly from the boilers, and exhaust it independently into the air, or into a condenser, as the case may be. In this instance it went directly to the air.

Taking diagrams from these cylinders he found them very much like Fig. 1. He proceeded, at the first opportunity, to disconnect the connecting rod on one side of the engine from the crank pin, and let it rest on the frame, as shown in Fig. 4. The throttle valve for this cylinder, also

covers and cylinder head, turn on steam and start up. The use of white lead, or any similar substance, makes it necessary to thoroughly remove it from all surfaces before it is safe to turn on steam, as some of it would be sure to cause trouble. This disagreeable job is eliminated by the use of graphite and cylinder oil, well distributed over the surfaces that are liable to rust.

WHY HE DIDN'T WANT MORE CRUCIBLES.

A Dixon salesman called on a well-known western manufacturer, in the hope of securing a crucible order, as no crucibles had been ordered by the firm for some time.

He was told that no crucibles were needed, but the statement was accompanied by a smile, and the manufacturer added: "The fact is, I cannot give you an order this time, because the Dixon crucibles are now giving such good service that we do not have to buy so often, although we make just as much brass as ever."

The Dixon Company are determined to keep the Dixon crucibles as they have been for the past seventy years, "the standard the world over," and no pains or expense are spared anywhere along the line of crucible manufacture.

YOUR FRIEND THE DRUMMER.

The man who drums for your trade is as much a part of mercantile life as the goods he sells. You may be tried and harassed by a few of the tribe, but the rank and file are nearer to being your friends than you many times think. We make a plea here for the drummer, and for your best treatment of him.

In the first place, treat him well and try not to waste his time. His days are all busy and he has no hours to waste. You need him as much as he needs you, and his friendship is worth as much to you as yours is to him.

He frequently sleeps in bad beds, eats bad food, loses rest, but he comes up smiling and pleasant with it all. He wants to show you his line, and he not only hopes but expects to sell you something. He is three days behind schedule, and the house has been hurrying him up, but he doesn't tell you of it, nor does he ask you to fall over yourself in getting ready to look through the samples. He is steeped in patience and battered by rebukes; he is never certain and never feels safe; he hopes, but he never knows; yet, when he enters your presence there is not a sign of ruffle in his manner and no trace of impatience or fear. He puts confidence into your soul by the way he fairly breathes confidence concerning the goods he wants to show. He can inspire you and your clerks, even though you feel compelled to pass him along. You are glad to see him whether you want to admit it or not.

No obligations hold you toward buying from him, but the plain obligation of one man toward another should induce you to treat him with every consideration that can assist him. Out of plain gentlemanliness, do not hold him all day and send him away without looking through his trunks or buying a cent's worth, when you know in the morning that you cannot place an order. Tell him frankly the situation if you cannot immediately accommodate him, and let him stay on his own responsibility if he waits for you.

Put yourself in the drummer's place and do the best you can and by him. Apply the golden rule. He is sensible and reciprocative. If he happens to be otherwise you may rest assured he will not trouble you many times, for his career will be short.—*The Glovers' Review*.

DIXON'S GRAPHITE BRUSHES.

For Motors and Generators.

Although Dixon's Graphite Motor and Generator Brushes are rapidly making their way through the little advertising that we are giving them and through the intrinsic value that they possess, yet it is very pleasing to us to have reports such as the following.

Accompanying an order, the chief engineer of a very prominent plant writes:

"We are sending you herewith an order for sixty-two brushes. Your representative left a set of Dixon's Graphite Brushes for trial, and they are the best we have ever had. We use a great many, as we have eighty motors in the building, and will give you a larger order later."

Since the above was written we have received an order for 500 brushes.

A gentleman whose business it is to go through electric plants writes us as follows:

"I find, in going through electric plants, a great many motors that are sparking and cutting, and which are a continual source of annoyance. By asking the man in charge what the cause of all this trouble is, he says he has tried all sorts of compounds, all sorts of remedies, etc., and finally says there must be something the matter with the machine which he is unable to discover.

"In a later trip through the same plants, I have found things running quite differently, and on inquiry of the same engineers, I am told that there really was nothing the matter with the machines, that the fault was with the brushes, and that when Dixon's self-lubricating Graphite Brushes were put on, all the trouble ceased, and that in a few days there was a fine gloss on the commutators and no further need of continually looking after the machines. The Dixon Company should be congratulated in having produced a brush of this kind. It certainly has no equal in the market."

BISHOP WATTERSON AND THE DRUMMER.

Bishop Watterson tells a story of how he was once taken for a "drummer" by a traveling salesman who was riding on the same train. Indeed, the stranger was so confident that he was addressing another of the guild that he began the conversation by inquiring:

"Do you represent a big house?"

"Biggest on earth," replied the bishop, who was "on in a twinkling."

"What's the name?" was the next question.

"Lord & Church," replied the bishop.

"H'm!" mused the drummer; "never heard of it. Any branch houses?"

"Branch houses all over the world," said the man of God, easily.

"That's queer!" went on the drummer, who began to think he had run across a boastful representative of some small concern. "Er—boots and shoes?"

"No," said the bishop.

"Hats and caps?"

"No."

"Dry goods?" asked the drummer, beginning to display irritation.

"Well," said the bishop, "some folks call 'em notions."

—*American Tit-Bits*.

Volga, N. C., Oct. 5, 1903.

Sample 'Eterno' copying pencil received and I am very much pleased with it.

It is a first-class copying pencil in every respect and I will send you an order for a supply in a few days.

Thanking you for the sample, I am,

S. M. Riddle, Postmaster.

Mansfield, Ohio, Oct. 12, 1903.

We thank you for the sample 'Eterno' No. 2050, which we consider a very excellent pencil for copying and general purposes.

The Lumbermen's Mutual Insurance Co.

ALL ABOUT PUZZLES.

Sam Loyd, the famous puzzleist, says parents should encourage a love for puzzles and tricks. They pertain to a species of mental gymnastics which does much toward clearing fog and cobwebs from the brain, so that one can see and think properly. There is no other school which sharpens the wits and teaches ingenuity. It is a well-known fact that such scientists as Tyndall, Huxley, Humboldt, Darwin, Bacon, Euler, Herschell, and scores of others were pronounced puzzleists in their early days, and upon the axiom that the bend of the trunk supports the incline to the tree, it is safe to say that their early training gave the bent to their minds which after years inclined them to problems of great magnitude.

It is astonishing to find how even the average mind is to grapple with anything outside of the routine of every day affairs. Note the common expression on your friend's face if you ask him to define the relationship of the man who, apostrophizing a portrait, exclaimed: "Brothers and sisters I have none, yet that man's father was my father's son." Or the equally bewildering assertion of the young society lady: "That gentleman's mother is my mother's mother-in-law."

Mr. Loyd has found that successful men are correct and apt at mental arithmetic, whereas the average mortal is sadly bewildered by propositions which require a little thought to solve.

How many could be baffled simply by the unusual wording of a proposition: "If 10 hens cost tenpence and 10 hens cost tenpence, what will 10 hens without 10 hens cost?" Or the more familiar story of the seven cats, which would kill seven rats in seven minutes, and the required answer as to how many cats it would require to kill a hundred rats in fifty minutes.

Mr. Loyd says he has found that many profound mechanical principles, as well as those of higher mathematics, can be taught in a never-to-be-forgotten way through the medium of puzzles. The average boy who abhors square root or algebra finds delight in working out puzzles which involve similar principles, and could be led into taking an interest in mathematics through such mediums.

"If you should ask me to explain the fascination of puzzles and tricks," says Mr. Loyd, "I would say that it is just as natural for a person to wish to measure his wit against another's as it is to test their relative strength or agility."

"John says he can do that puzzle, and I guess I will not be beaten by him. Let us see who will do it first."

"There is the whole spirit of the thing in a nutshell. It is a contest of brains."

"Young people take delight in puzzles which employ pennies, buttons, scissors, strings, matches, pencils, or such things as pertain to the household, and any one with good repertoire wins their hearts. In fact, one clever trick, as a stock in trade, with the happy faculty of showing it off to good advantage, is quite an accomplishment, and will make a fellow popular and pass as a genius for a whole lifetime."

AN APPEAL FROM THE WEST.

I have an envelope bearing the stamp of Portland, August 19th, 1:30 P. M., 1904, addressed to Joseph Dixon Crucible Company, Yersey City, N. Y." It contains simply a piece of white paper on which is written in very black ink: "Don't forget your poor soul." Now, here is someone who has the idea that corporations have souls, and they do not want us to forget that we have one. Thank you, unknown friend, we will not forget it.

DIXON'S HANDY GRAPHITE ROPE DRESSING.

Mr. H. A. Greene, chief engineer of the Hotel Brunswick, Back Bay, Boston, Mass., writes us as follows:

"I find the boys here are using your graphite for many different purposes. I myself have just put it to another good use; that is, in the form of your graphite grease for elevator cables, put up in a package in the shape of a book. This is the best and handiest thing I have gotten hold of yet, and any engineer who has once used graphite grease in this form would never lubricate a cable in any other way or with any other material. I believe the man who got up that idea must have had some experience himself in greasing a cable."

GRAPHITE AS A LUBRICANT.

Under the title of "Graphite as a Lubricant," the Joseph Dixon Crucible Company is distributing a revised edition of their pamphlet concerning the use of graphite as a protection against abrasion of rubbing surfaces. The pamphlet is well worthy of consideration, as it contains much information of value based on actual service conditions, which is gathered from M. C. B. tests, railroad club proceedings, etc. The first chapter discusses friction and lubrication.

Continuing, the remainder of the paper is more closely identified with the use of graphite, either alone or mixed with oil, and the many forms and types of machinery on which it is used to advantage.—*Railway Master Mechanic.*



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